US005804118A

United States Patent [19]

Yada et al.

[11] **Patent Number: 5,804,118**

[45] **Date of Patent: Sep. 8, 1998**

[54] **MOLDING AND METHOD OF PRODUCING THE SAME**

[75] Inventors: **Yukihiko Yada**; **Kazuyoshi Higuchi**, both of Oobu, Japan

[73] Assignee: **Tokai Kogyo Kabushiki Kaisha**, Oobu, Japan

[21] Appl. No.: **637,172**

[22] Filed: **Apr. 24, 1996**

Related U.S. Application Data

[62] Division of Ser. No. 130,392, Oct. 1, 1993, Pat. No. 5,534,316, which is a division of Ser. No. 781,374, Oct. 23, 1991, Pat. No. 5,281,291.

[30] **Foreign Application Priority Data**

Oct. 24, 1990 [JP] Japan 2-286708
Nov. 8, 1990 [JP] Japan 2-304884

[51] **Int. Cl.**[6] **D01D 5/20**

[52] **U.S. Cl.** **264/167**; 264/177.1; 264/177.2; 52/708; 52/400; 52/716.5

[58] **Field of Search** 49/479, 373, 374, 49/488, 490; 296/93, 201, 208; 52/208, 400, 716, 397, 402, 403, 718.1, 716.2, 716.4, 716.5; 264/177.1, 177.2, 167, 40.7, 177.17, 117.1

[56] **References Cited**

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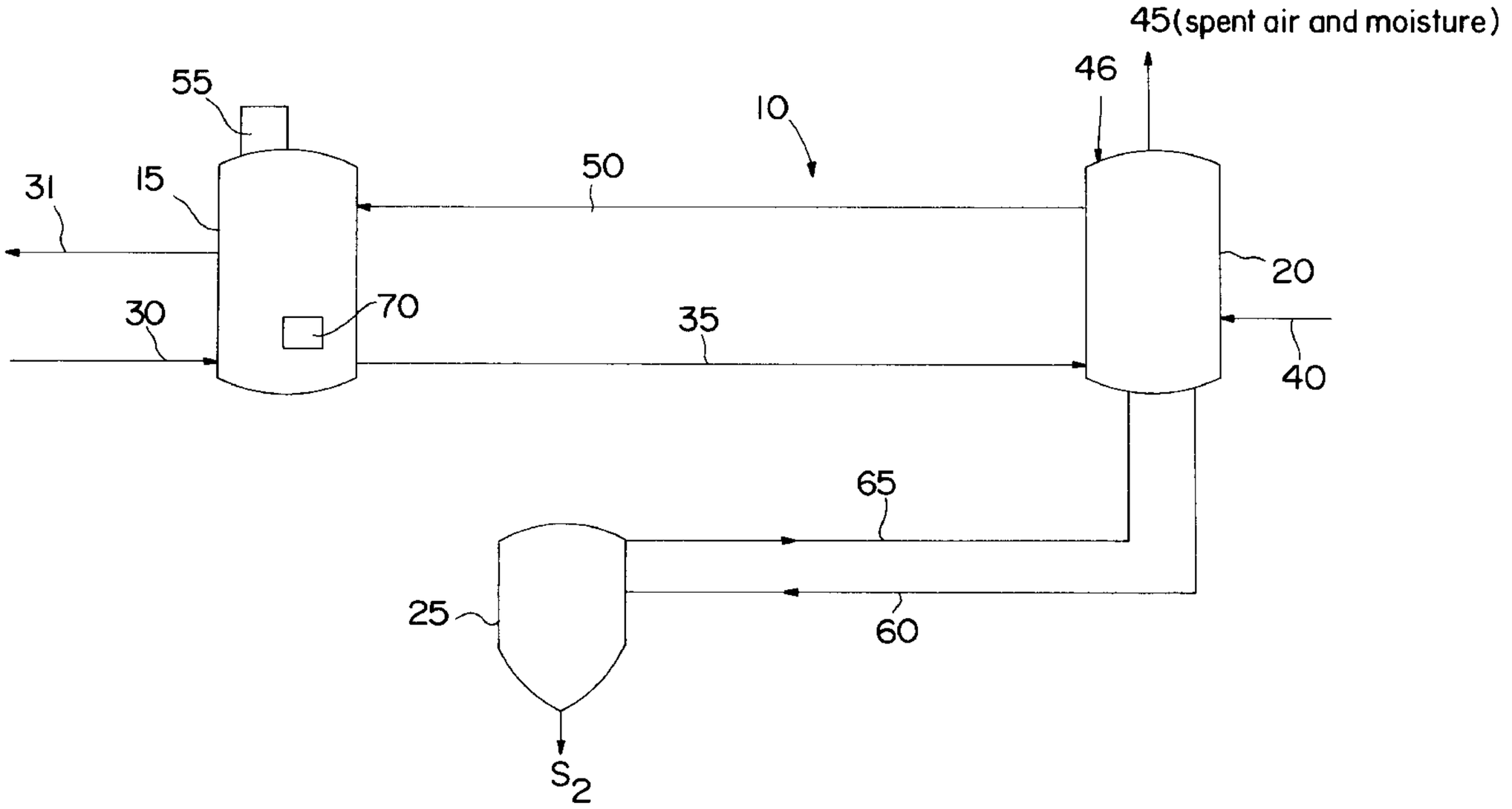
5,523,041	6/1996	Yada	264/167

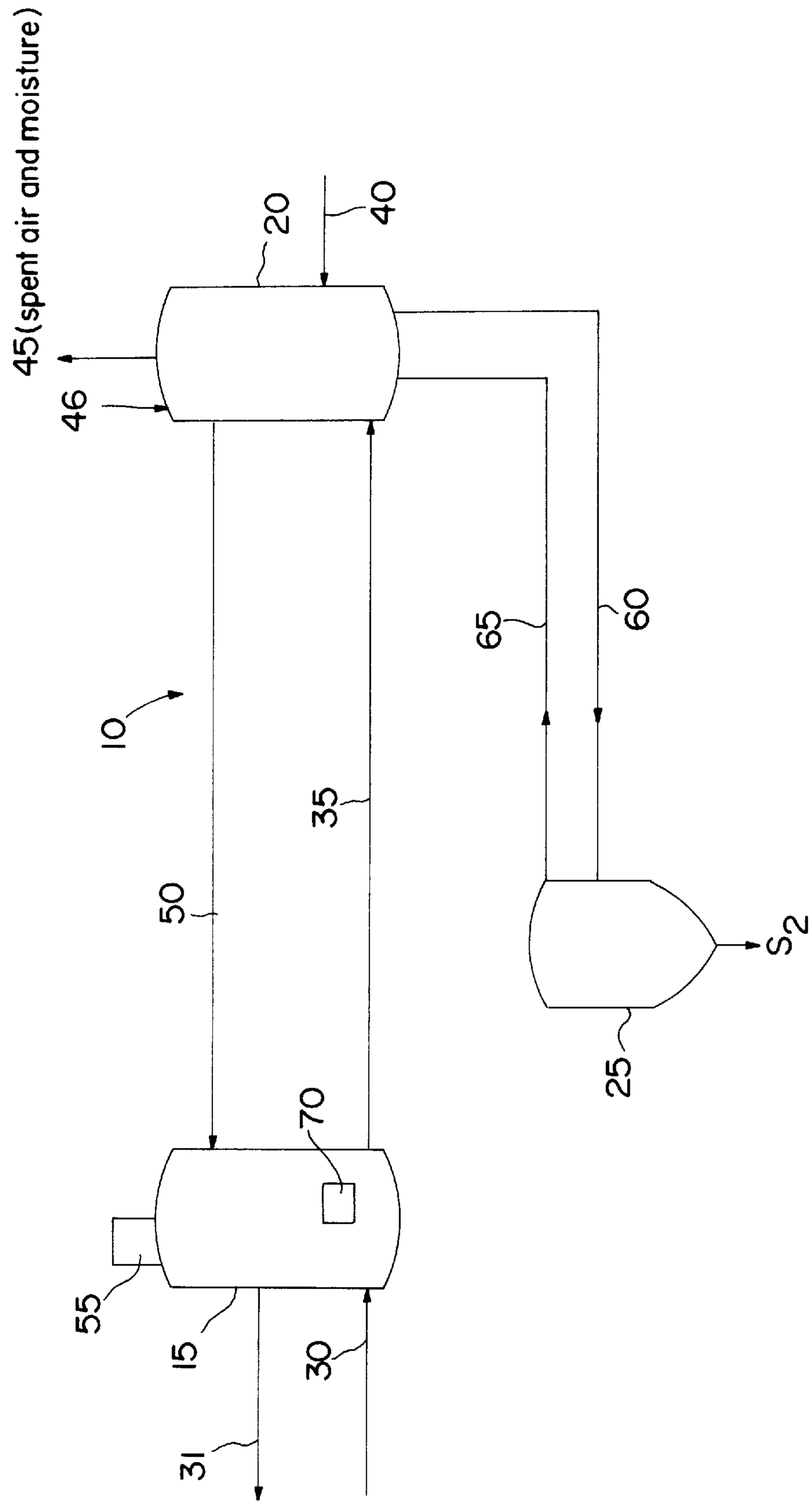
Primary Examiner—Merrick Dixon
Attorney, Agent, or Firm—Oblon, Spivak, McClelland, Maier & Neustadt, P.C.

[57] **ABSTRACT**

A molding with the cross-section thereof varying in the longitudinal direction. The molding includes: a support strip; and a protector provided along the length of the support strip so as to bring the molding into contact with a window glass; the support strip including a mounting portion, an outer piece with the height thereof varying along the length of the support strip and a top portion for connecting the mounting portion and the outer piece; and the protector being integrally provided with the outer piece of the support strip at the lower portion thereof by extrusion molding.

19 Claims, 25 Drawing Sheets




45(spent air and moisture)
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S_2

FIG. 1

FIG.2

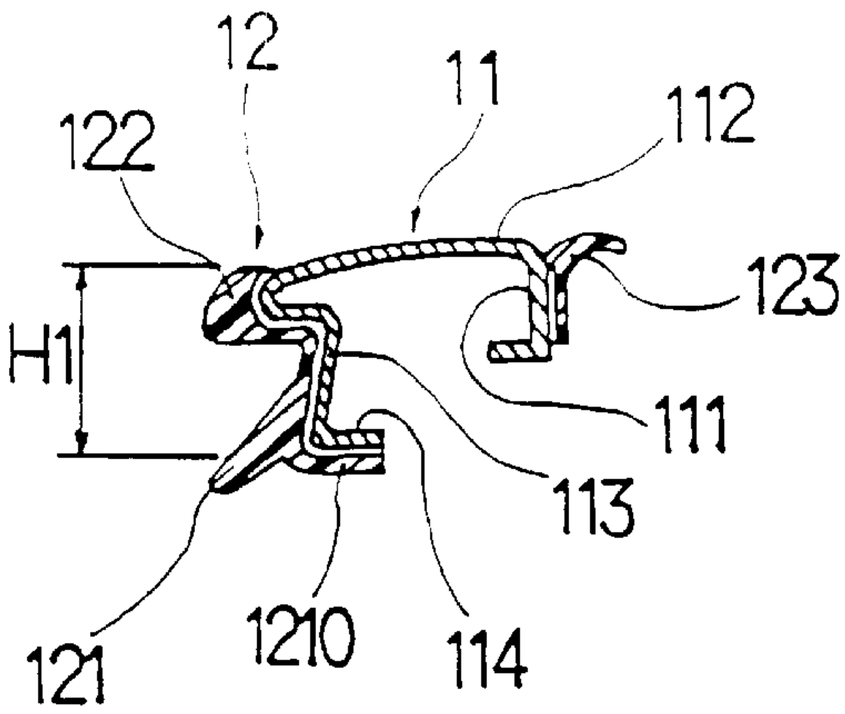

FIG.3

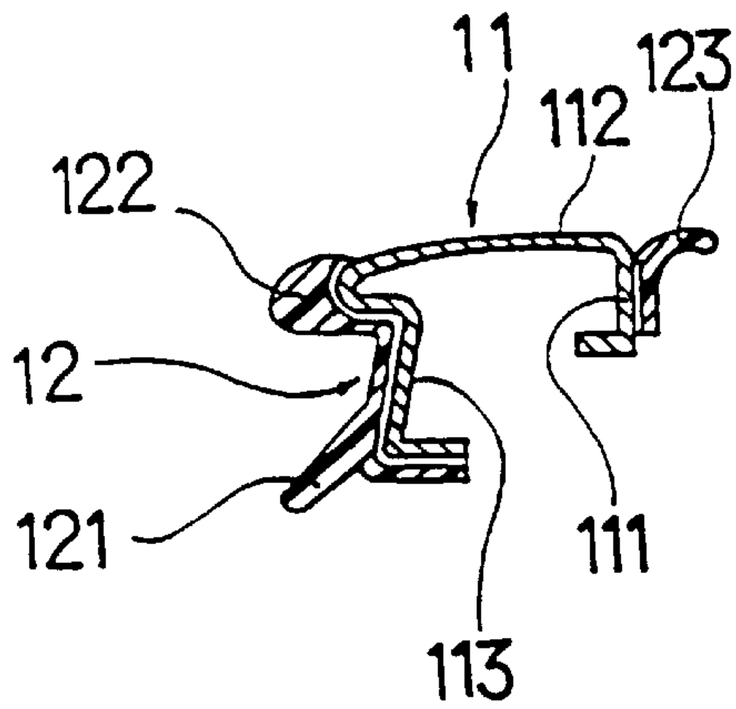

FIG.4

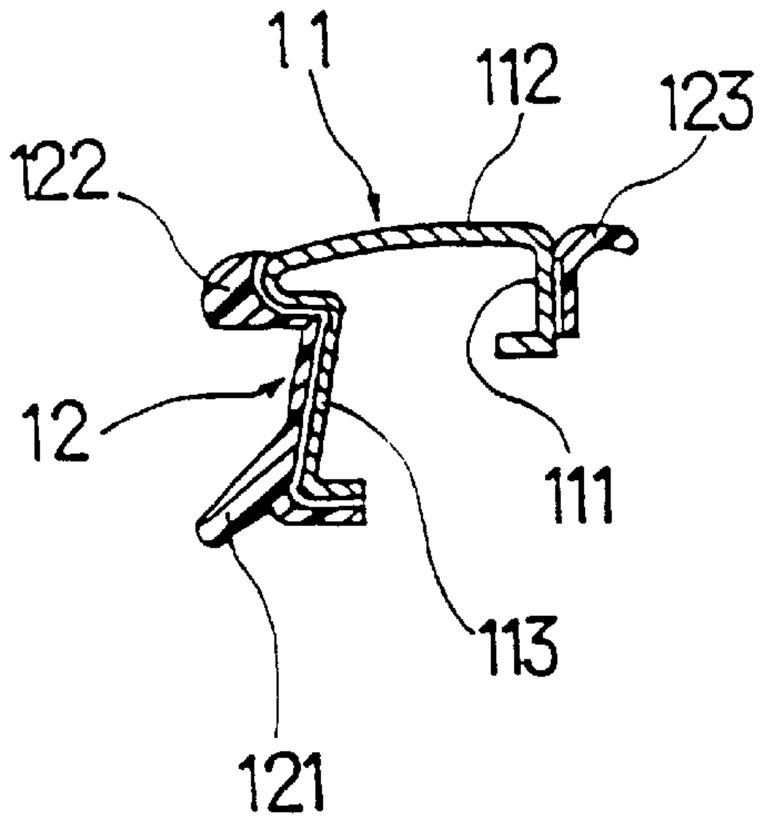

FIG.5

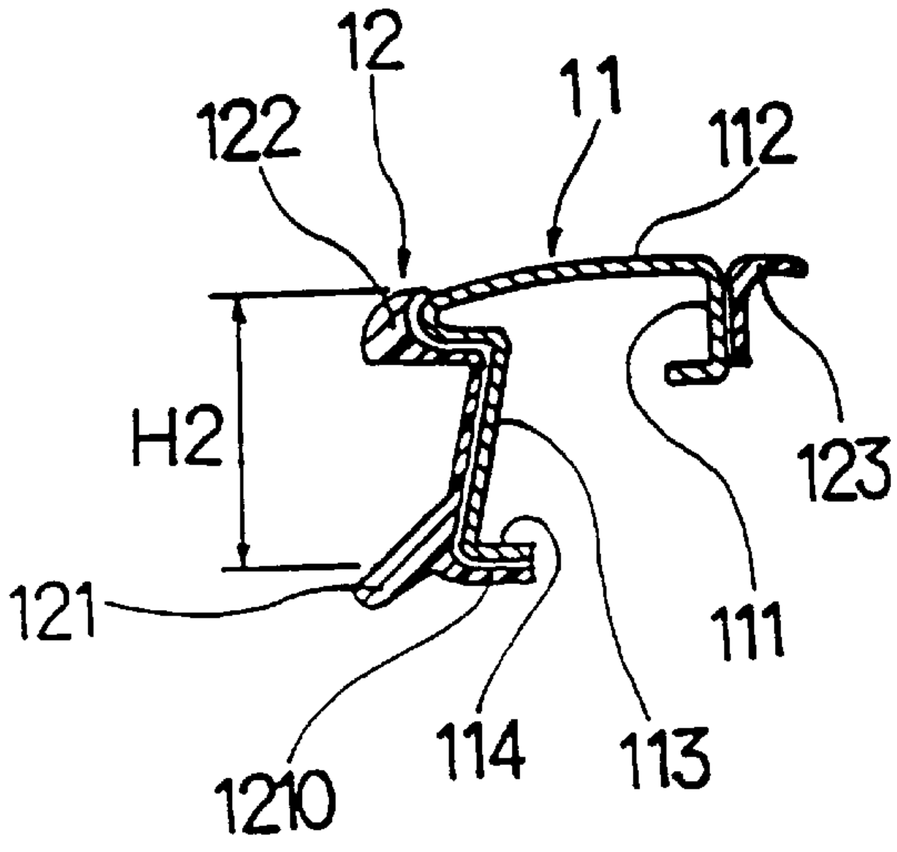

FIG.6

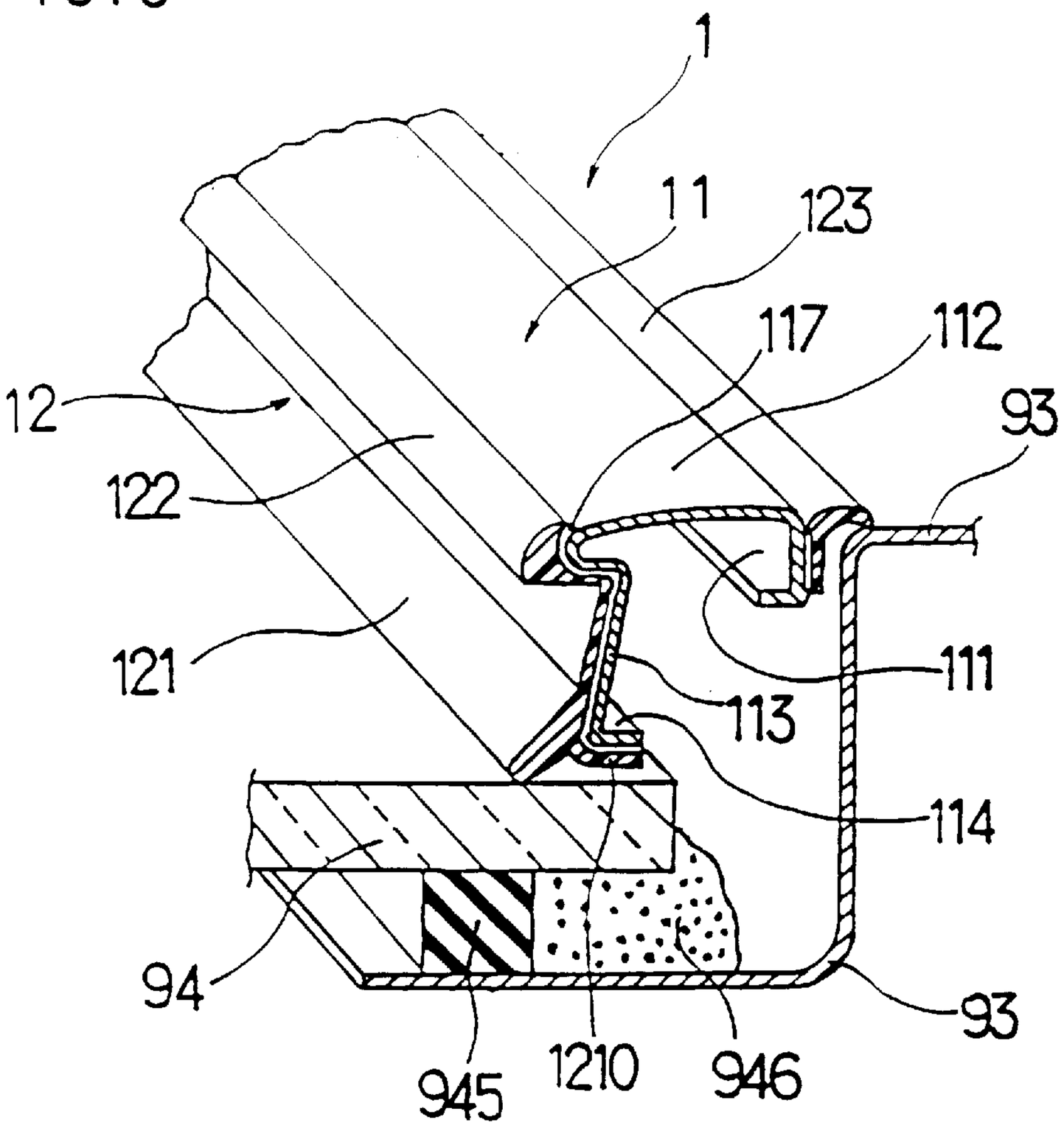
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FIG.7

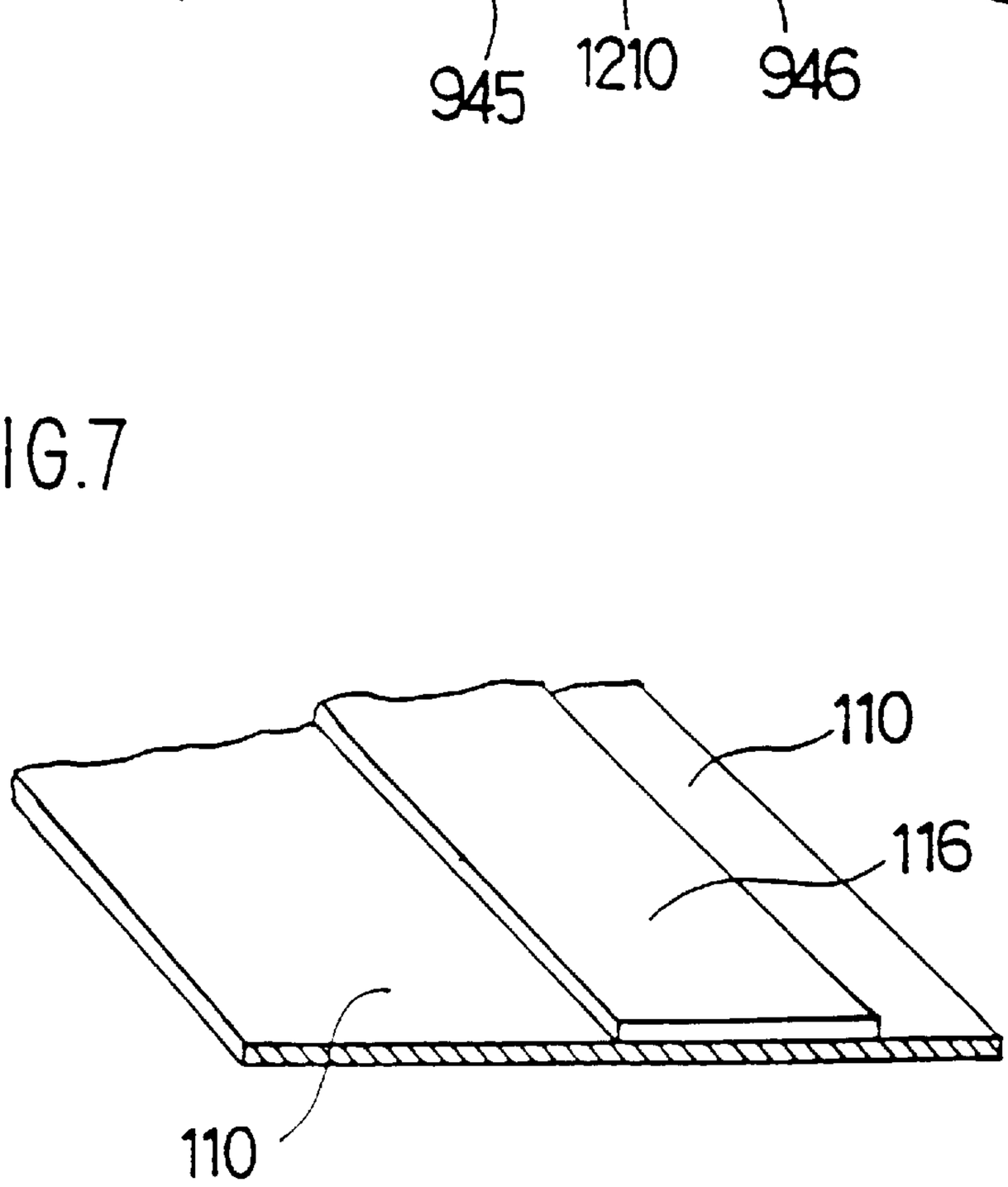

110
116
110

FIG.8

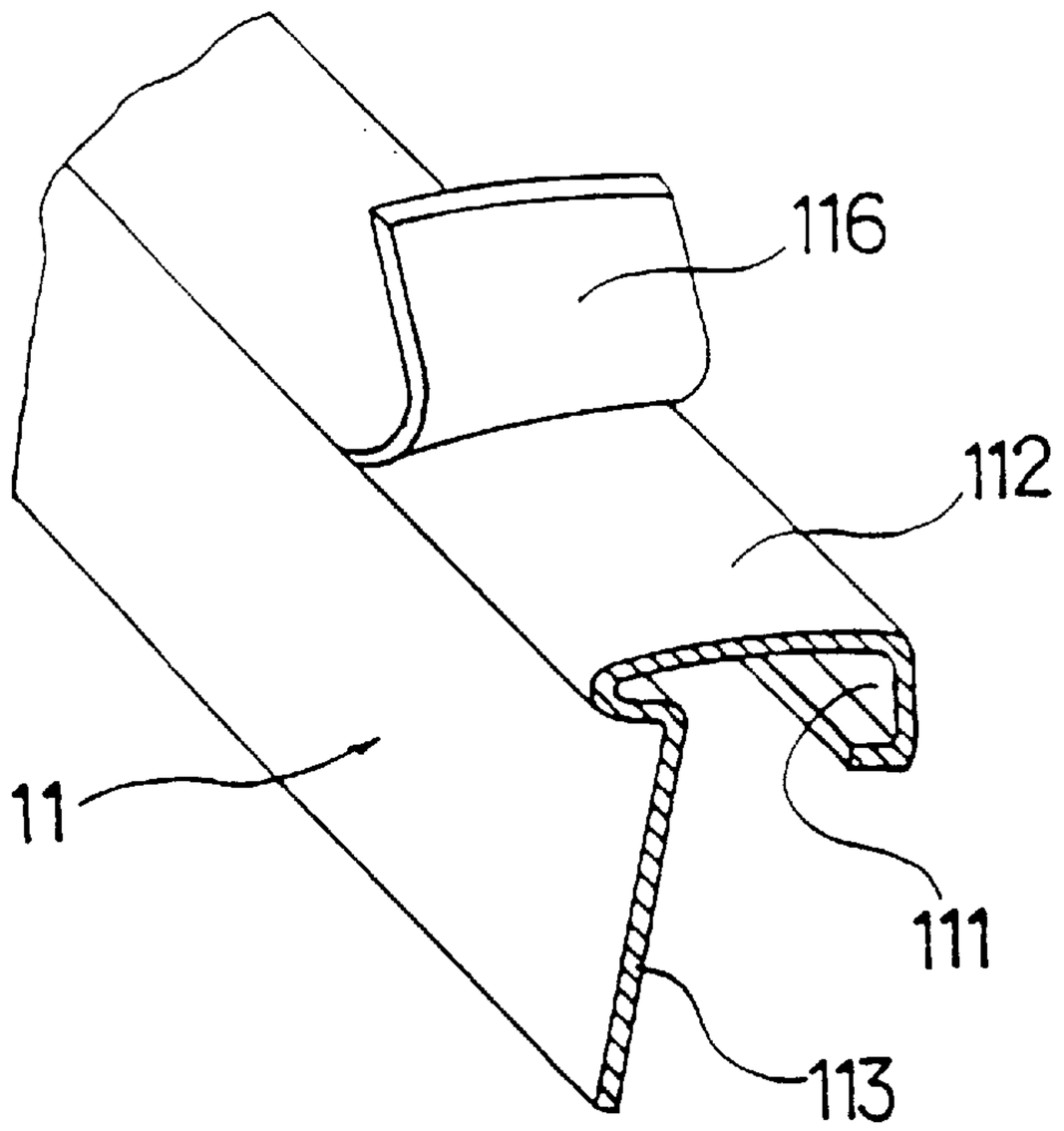


FIG.9

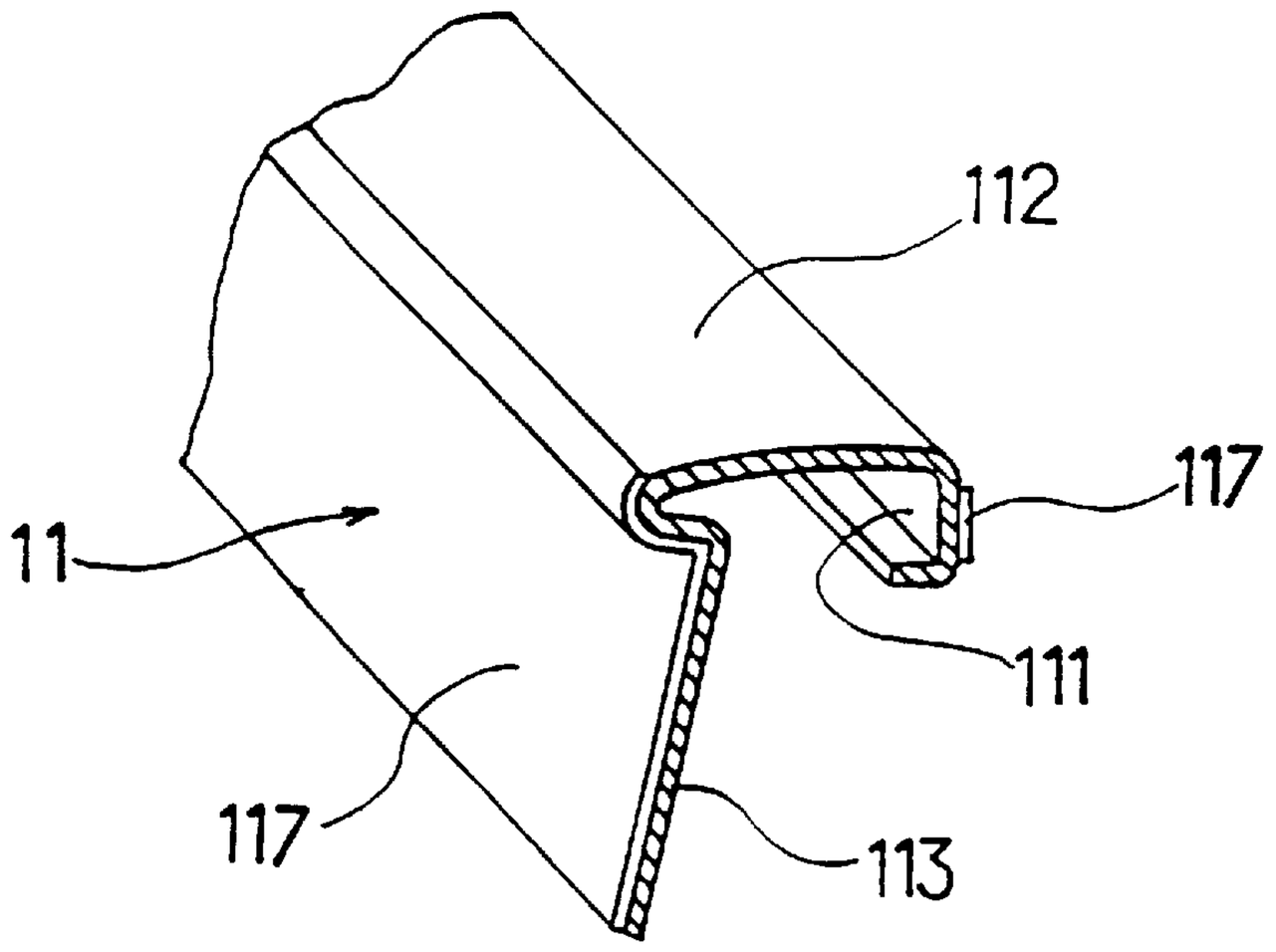


FIG.10

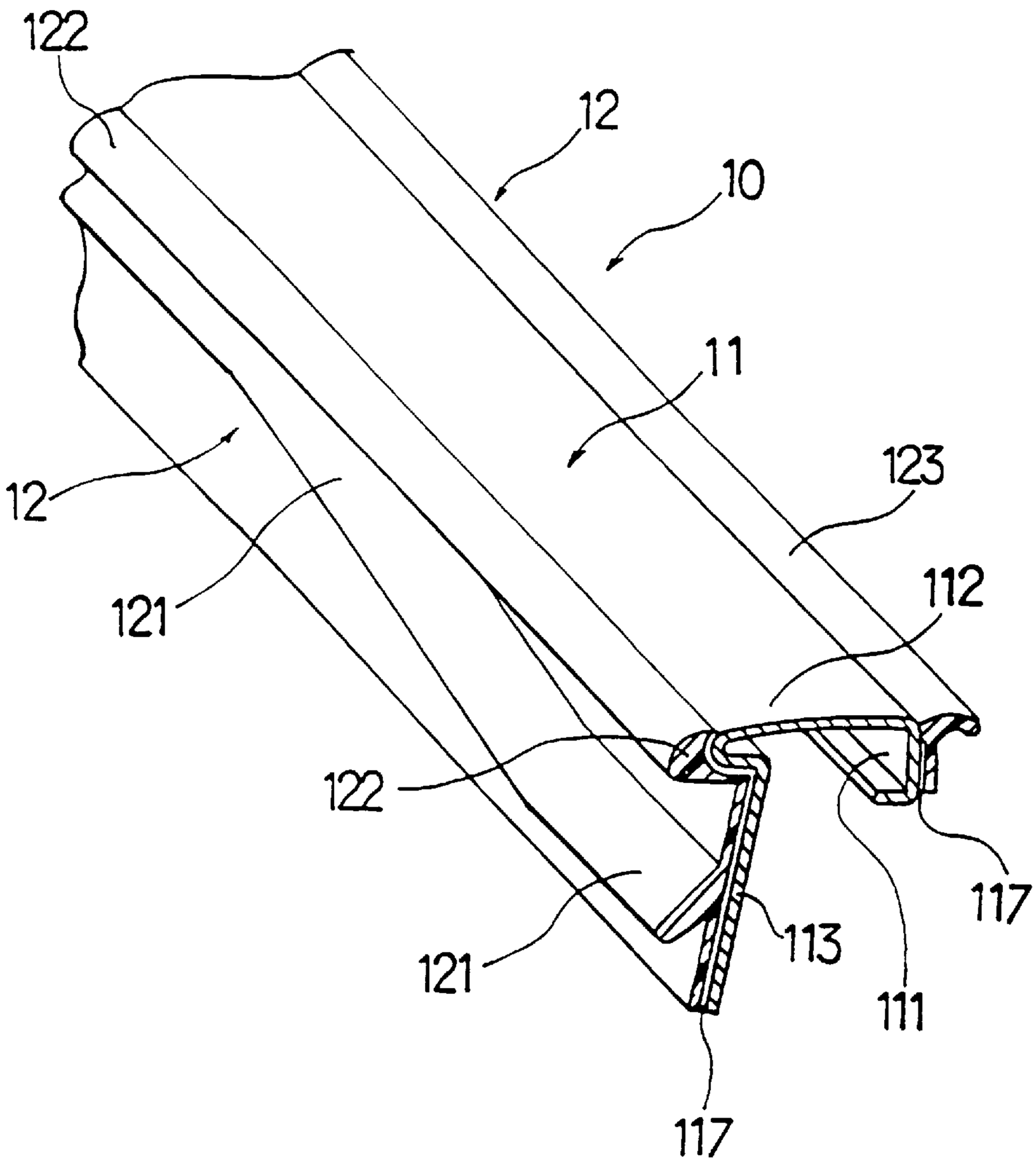
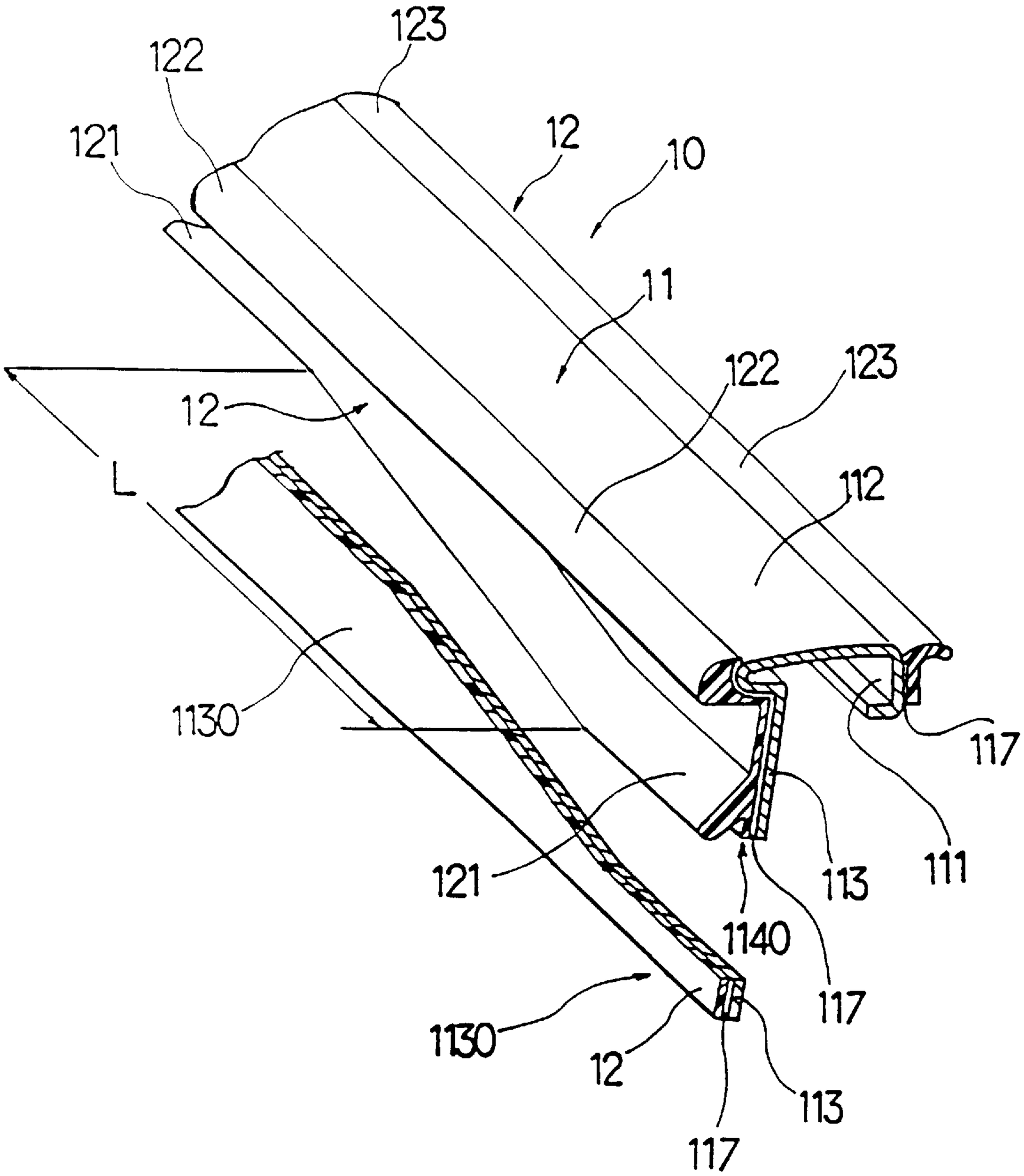


FIG.11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117

FIG.12

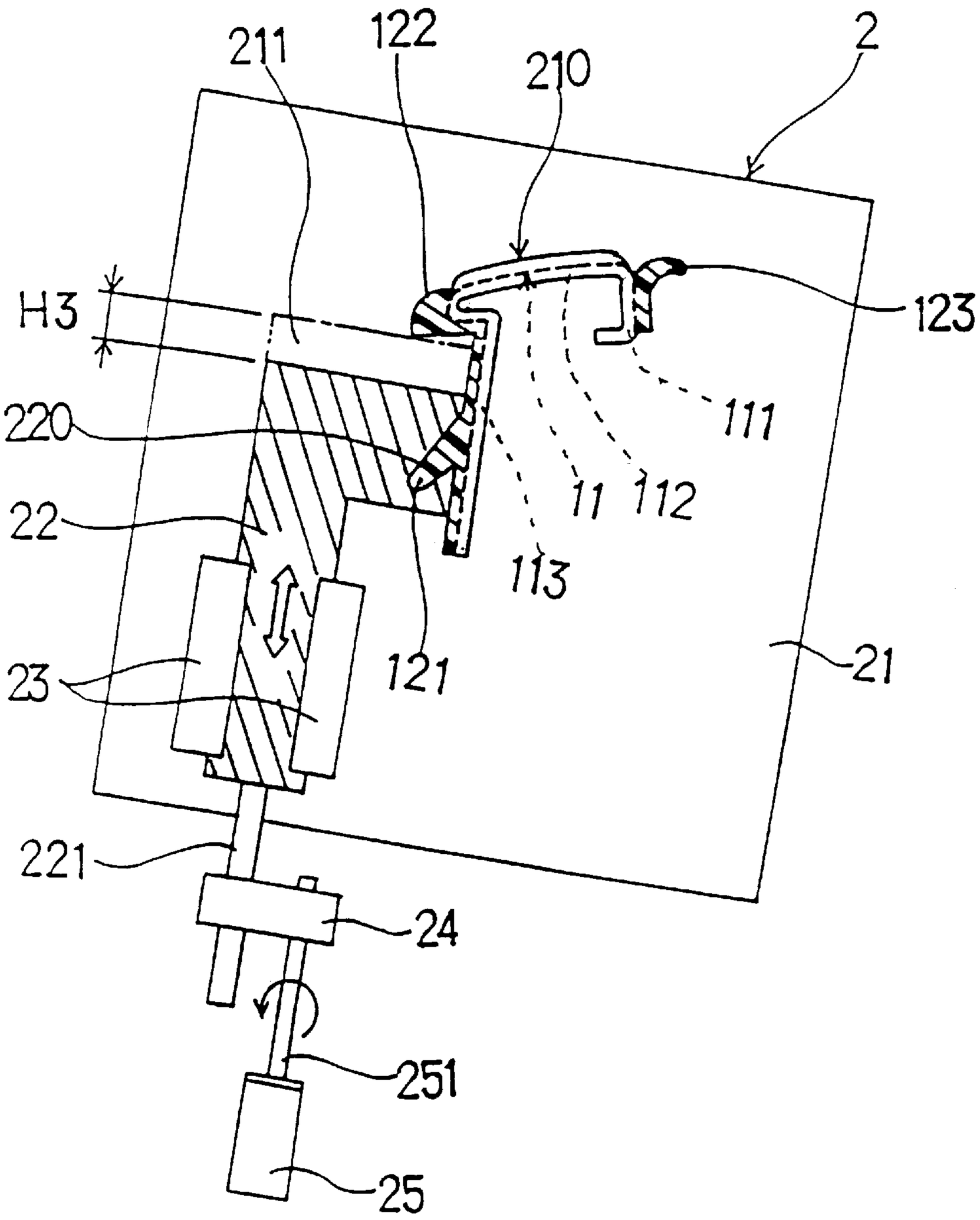


FIG.13

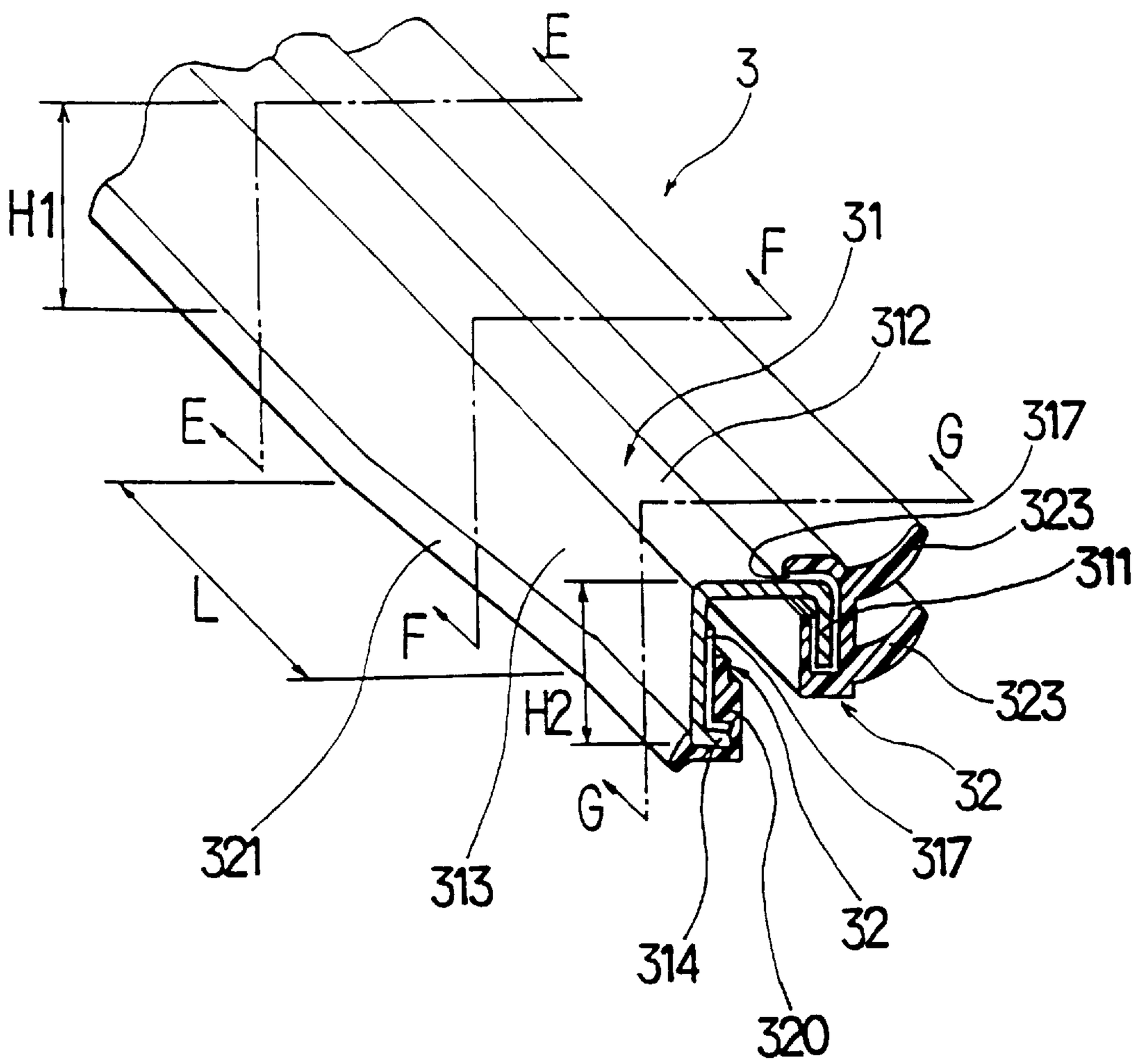


FIG.14

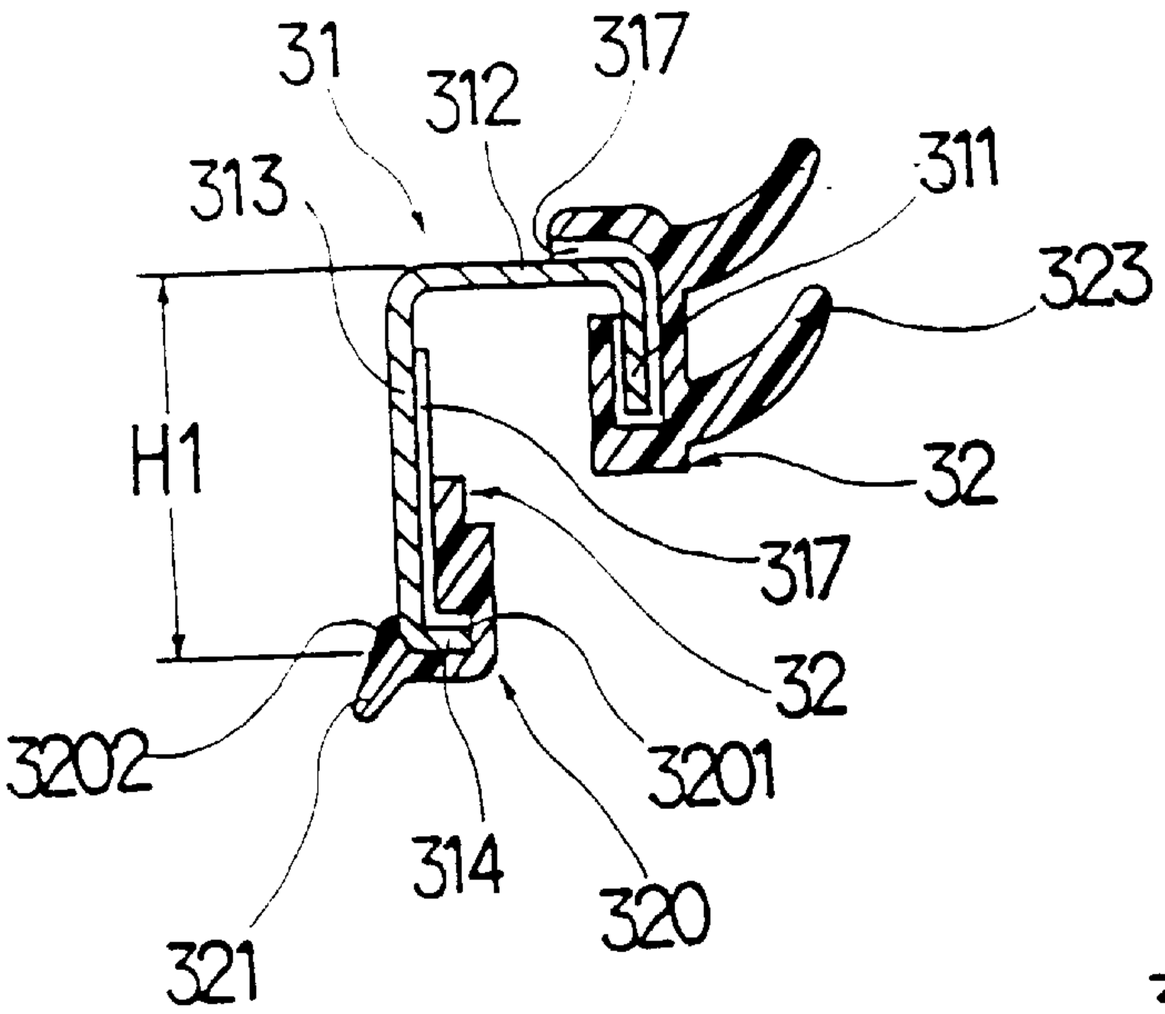


FIG.15

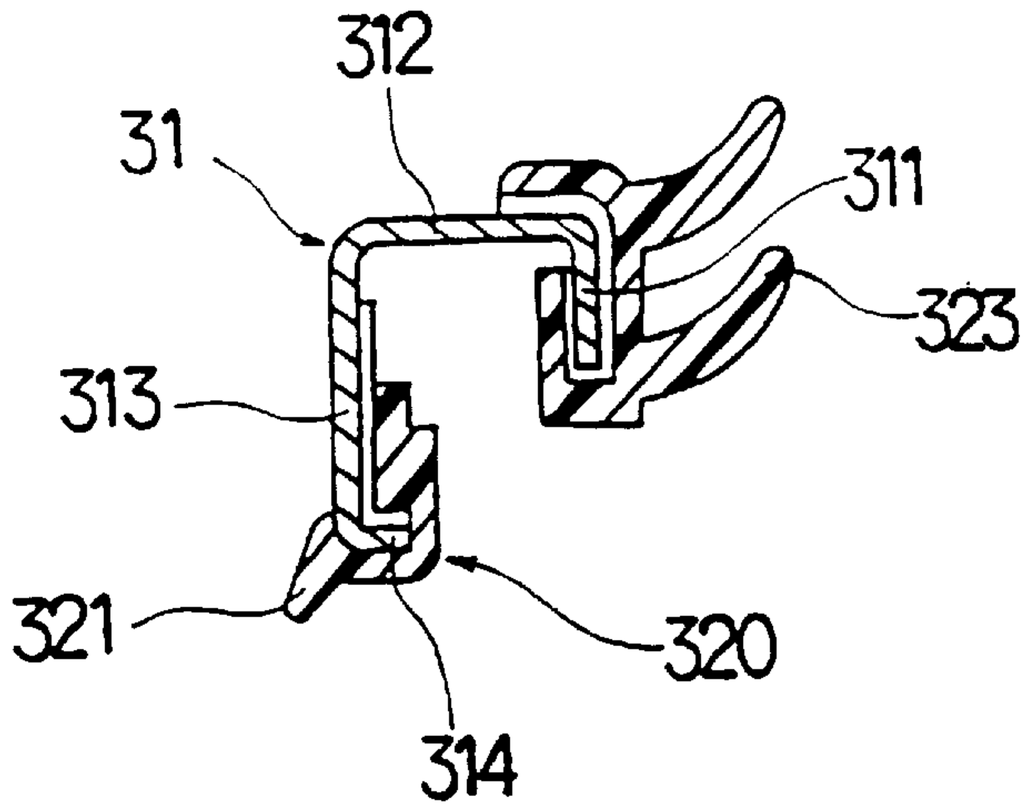


FIG.16

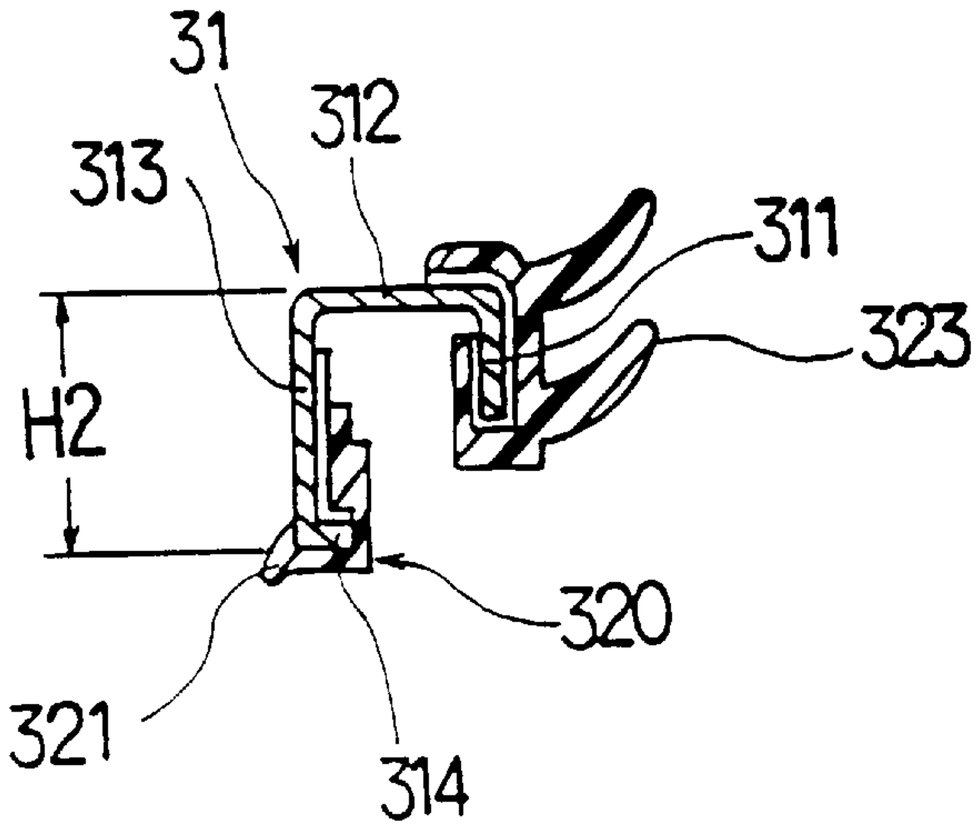


FIG.17

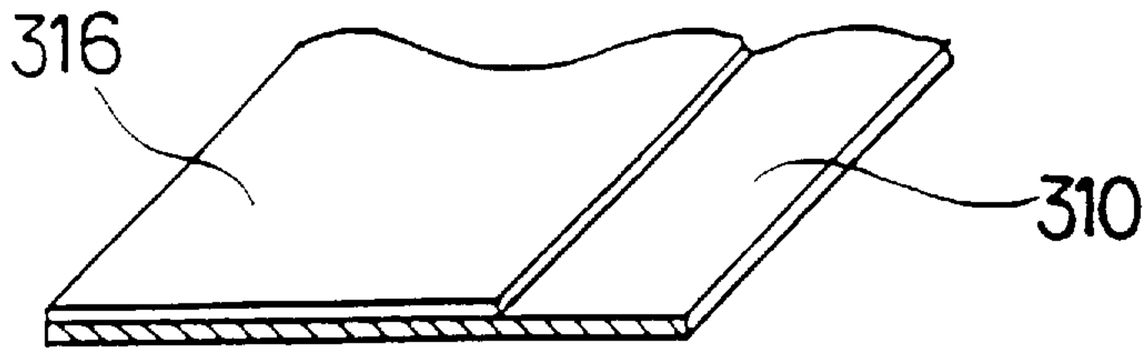


FIG.18

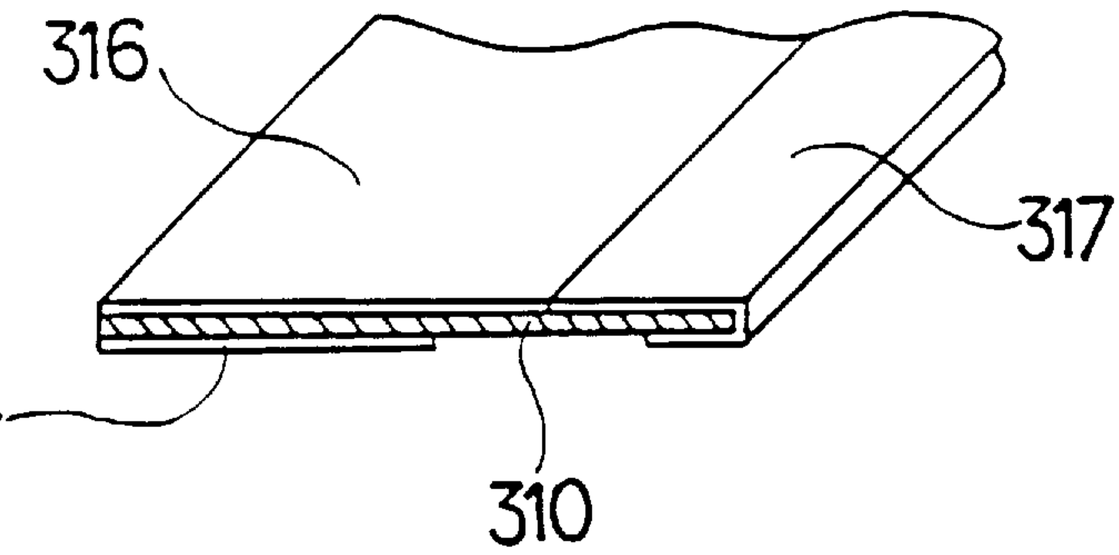


FIG.19

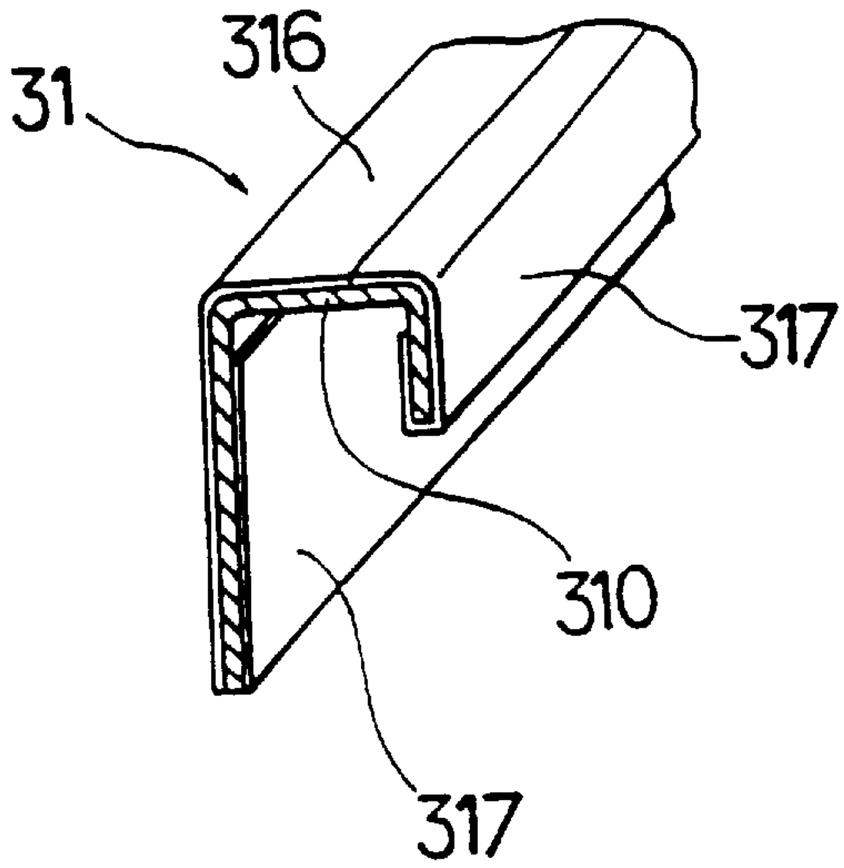
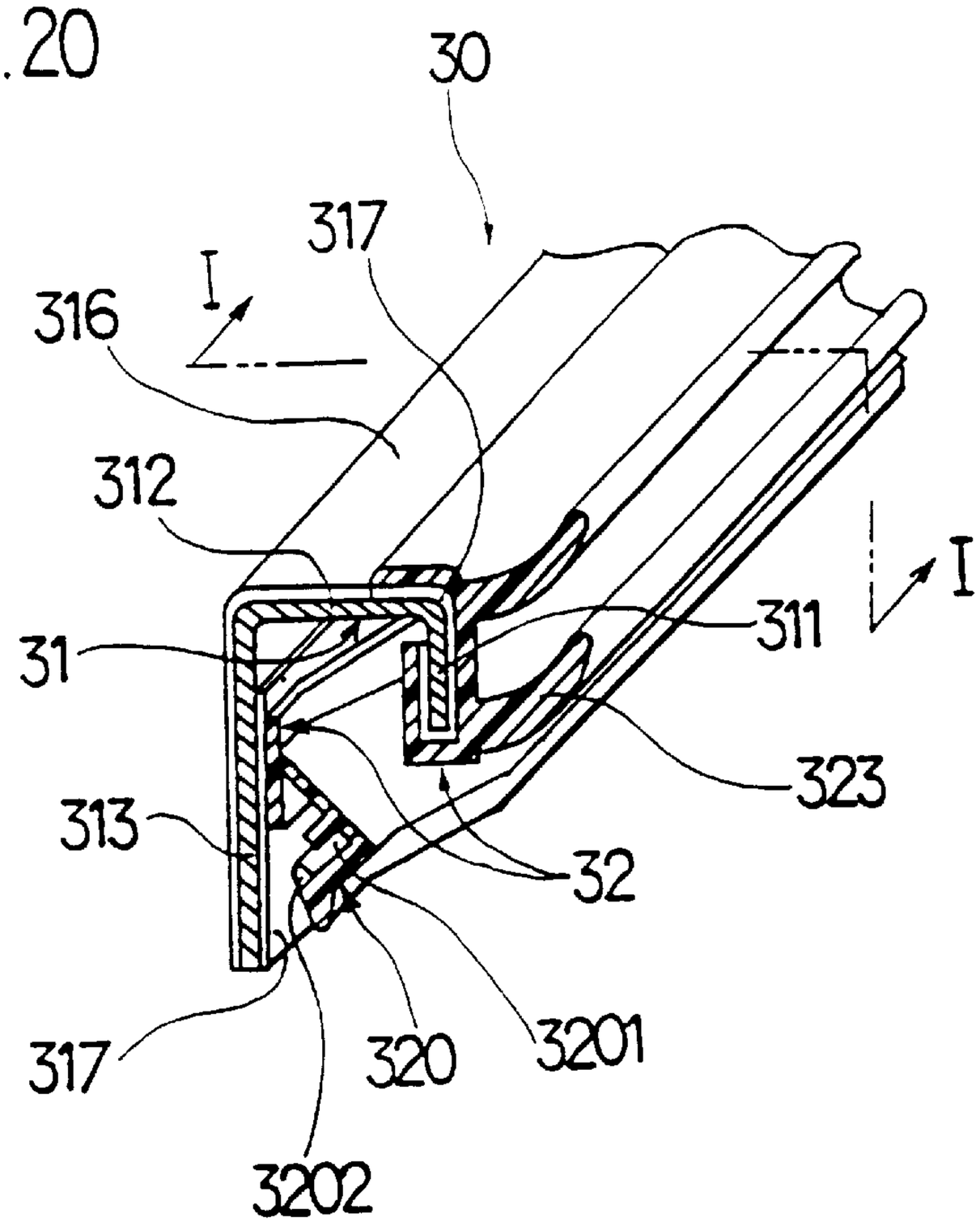


FIG.20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317
316
I
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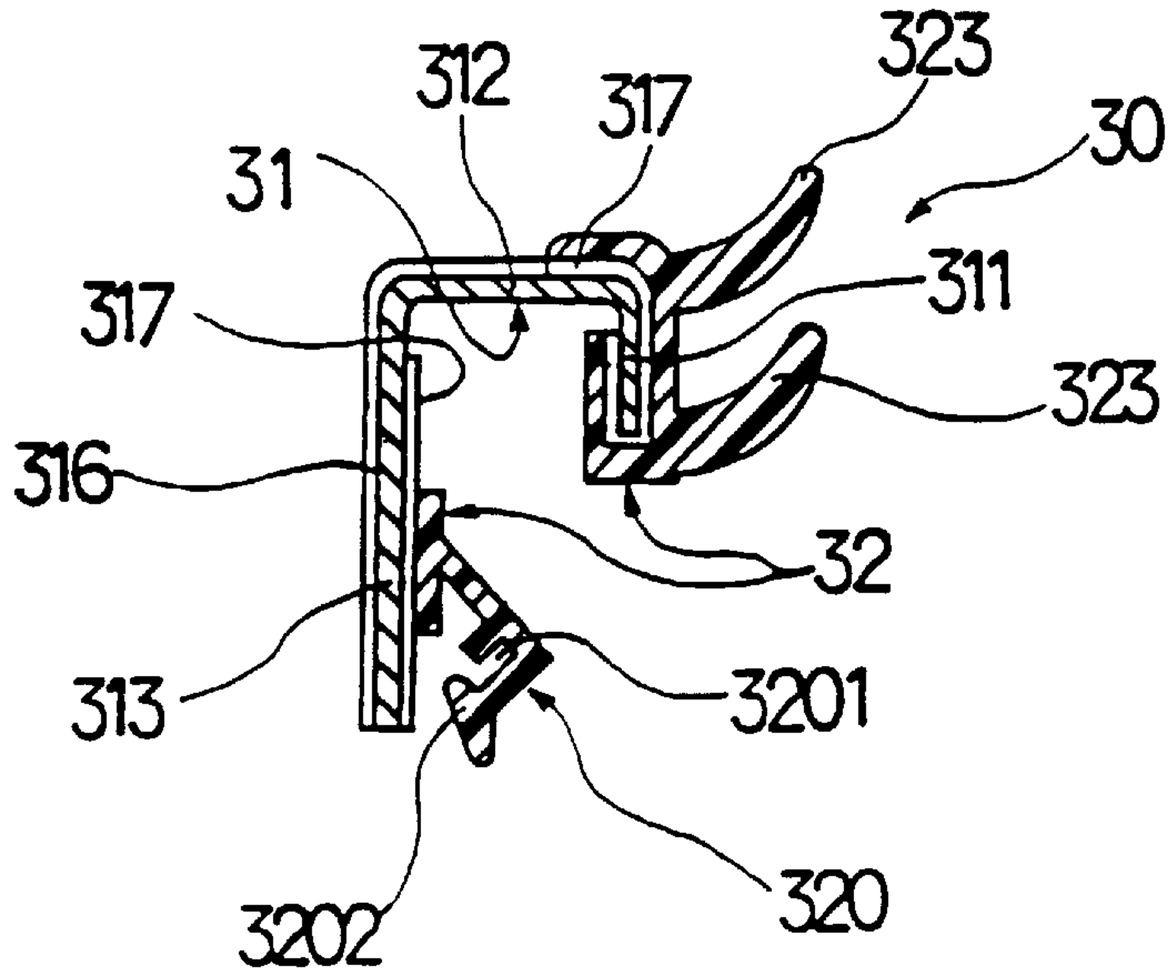
3201
3202

FIG.21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3201
3202
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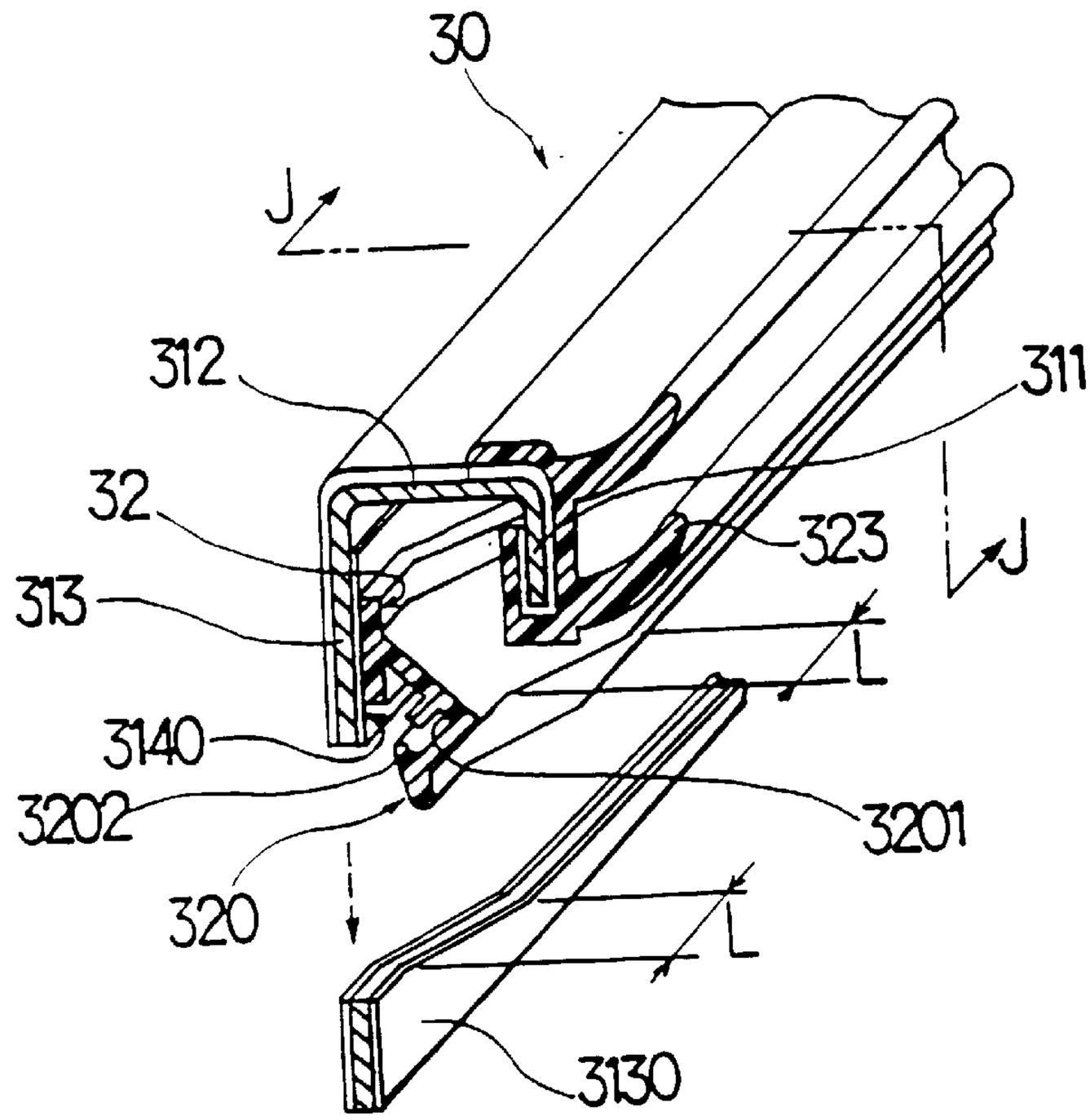
FIG.22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J
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J
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L
3140
3202
3201
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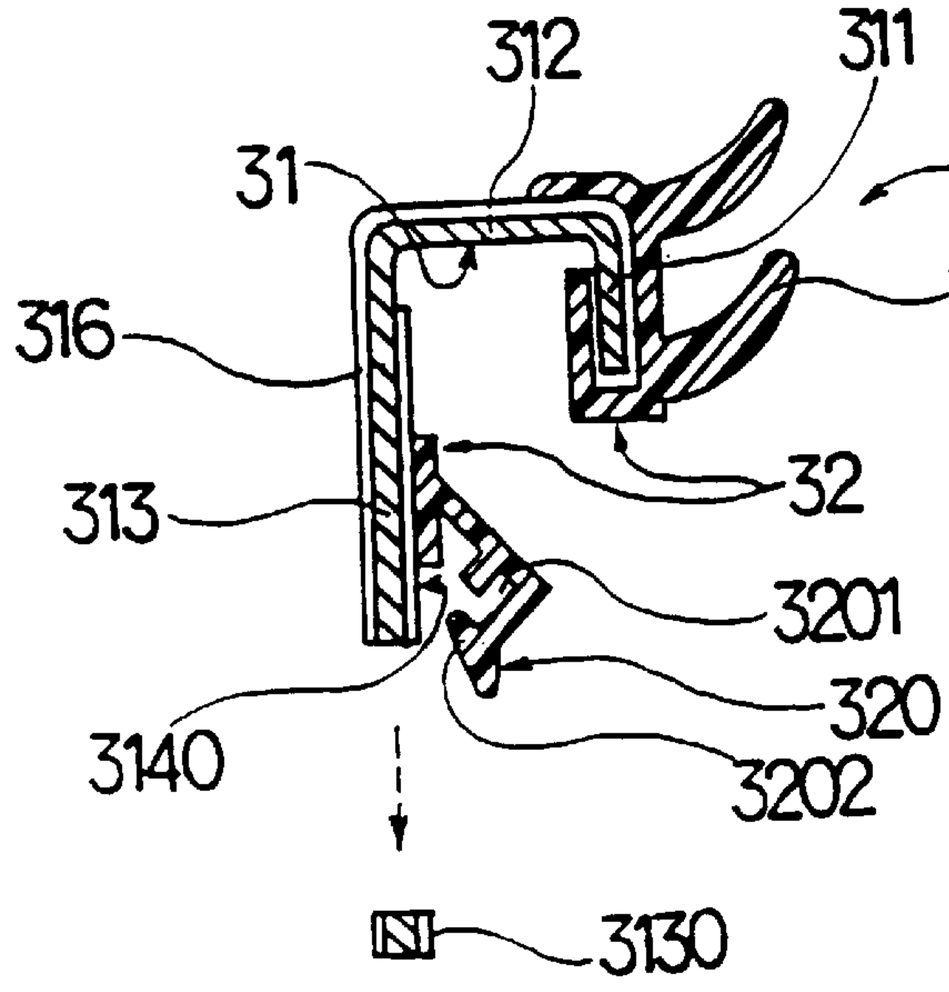
L
3130

FIG.23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3201
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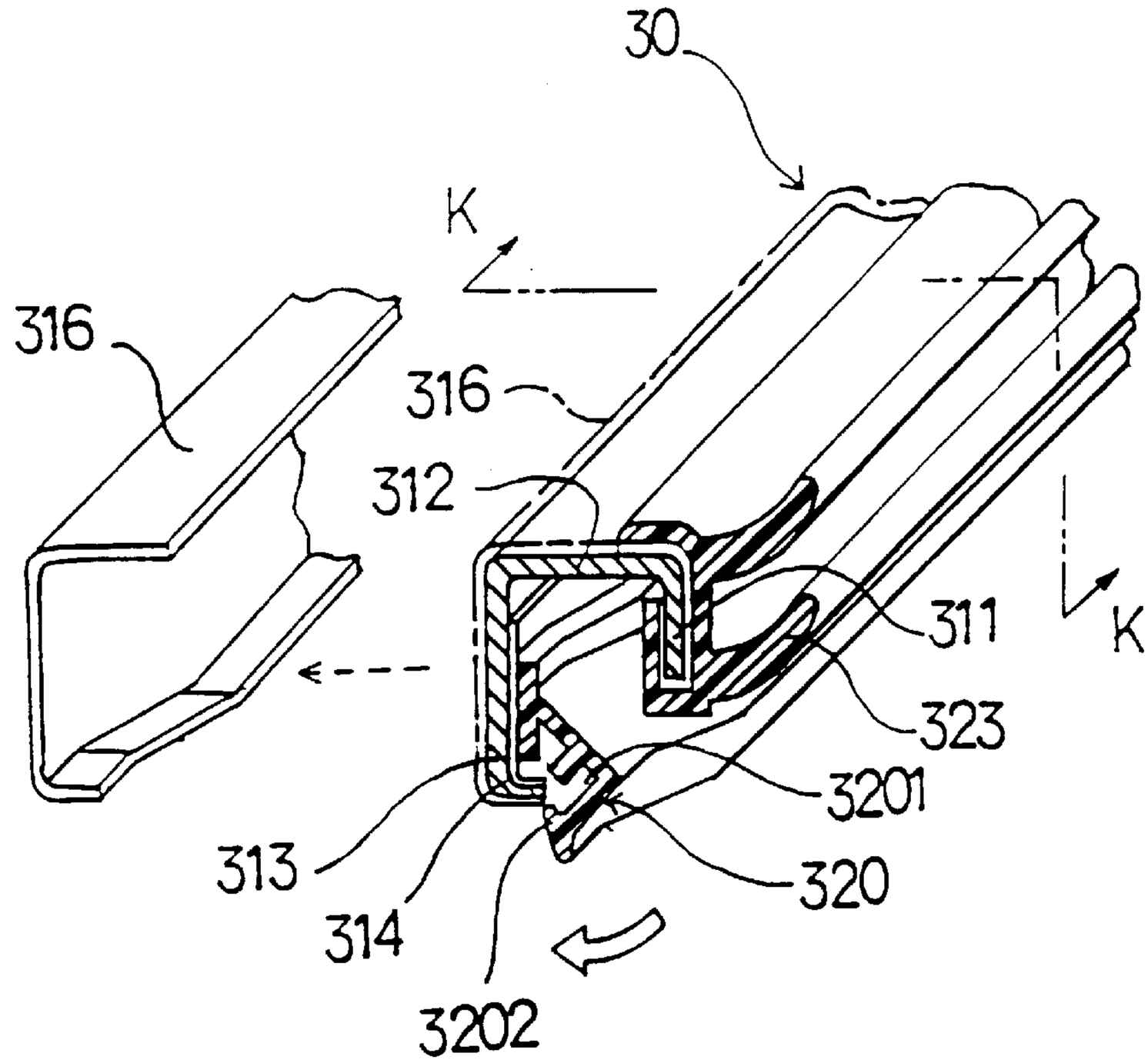
3140
3202
3130

FIG.24


30
K
316
316
312
311
K
323
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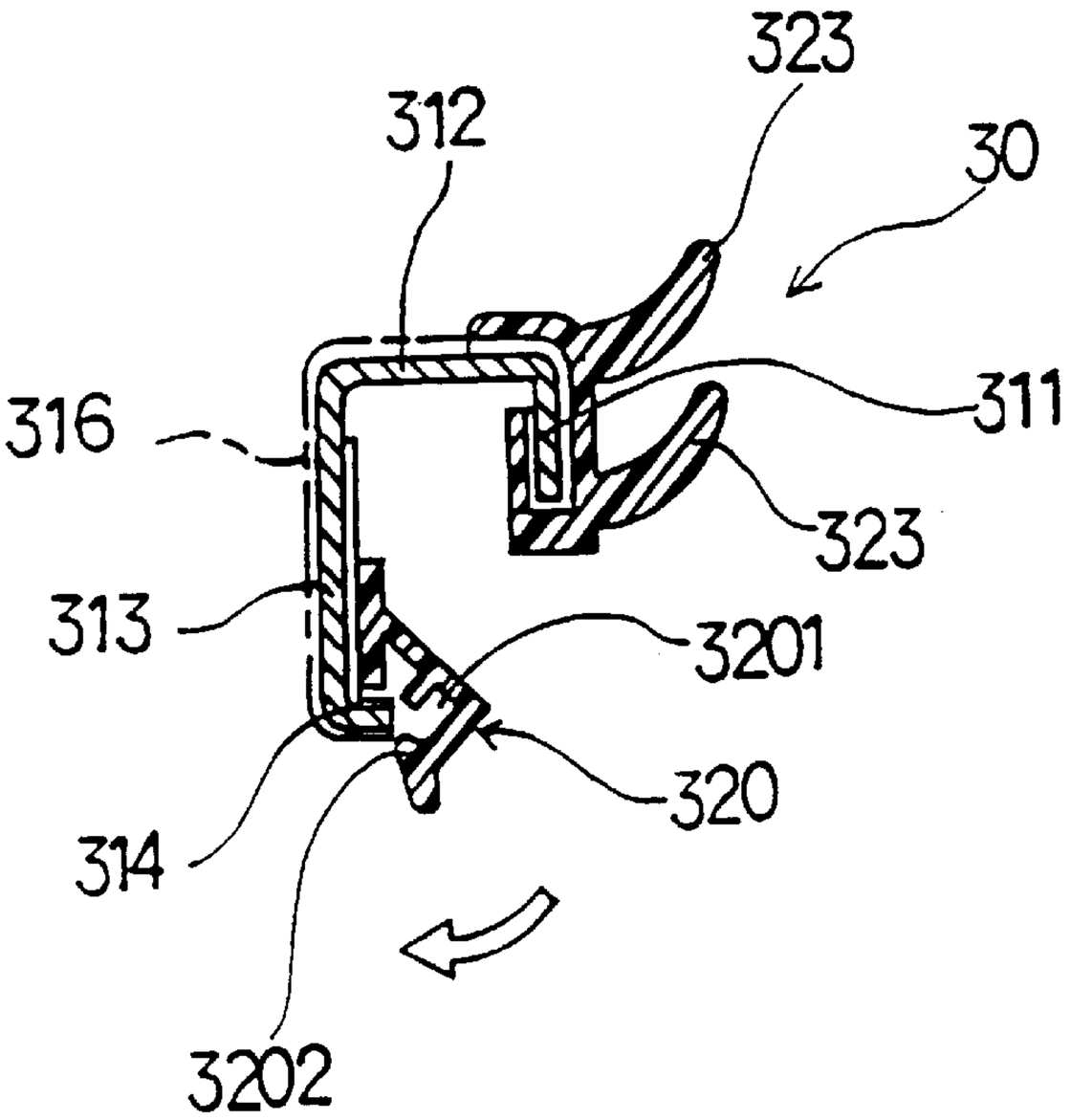
313
320
314
3202

FIG.25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316
311
323
313
3201
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314
3202

FIG.26

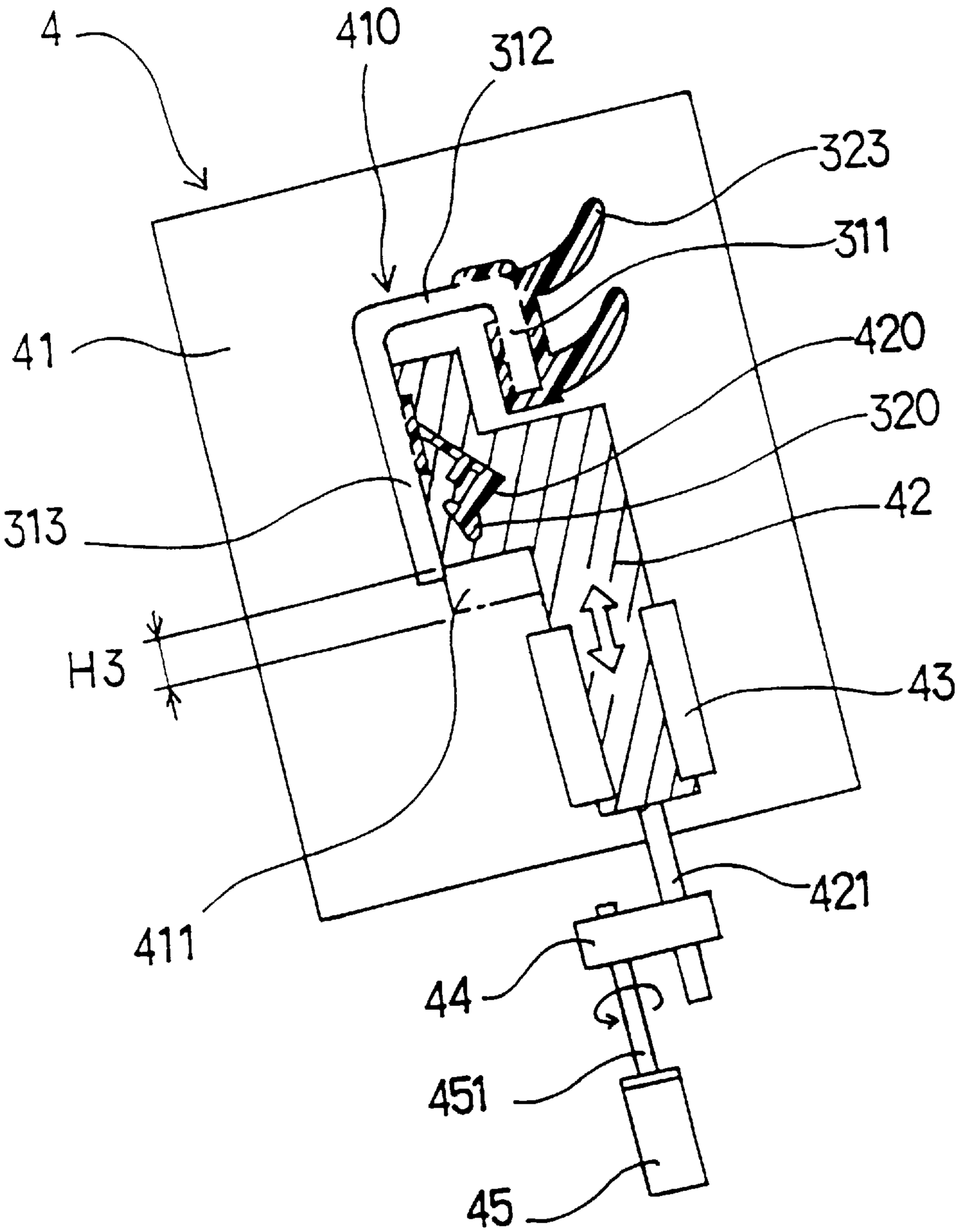
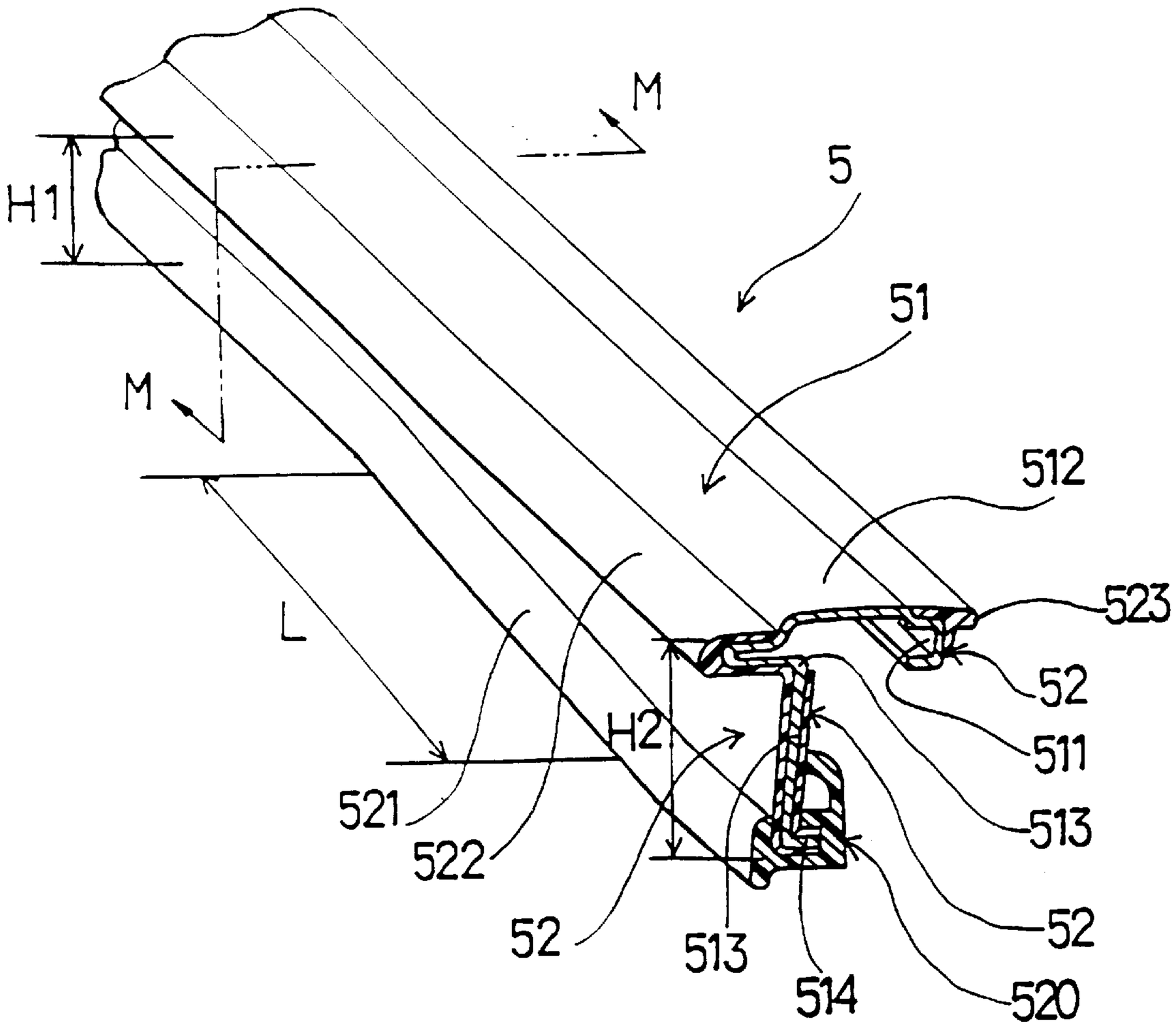


FIG.27


M
5
H1
51
M
512
L
523
52
H2
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521
513
522
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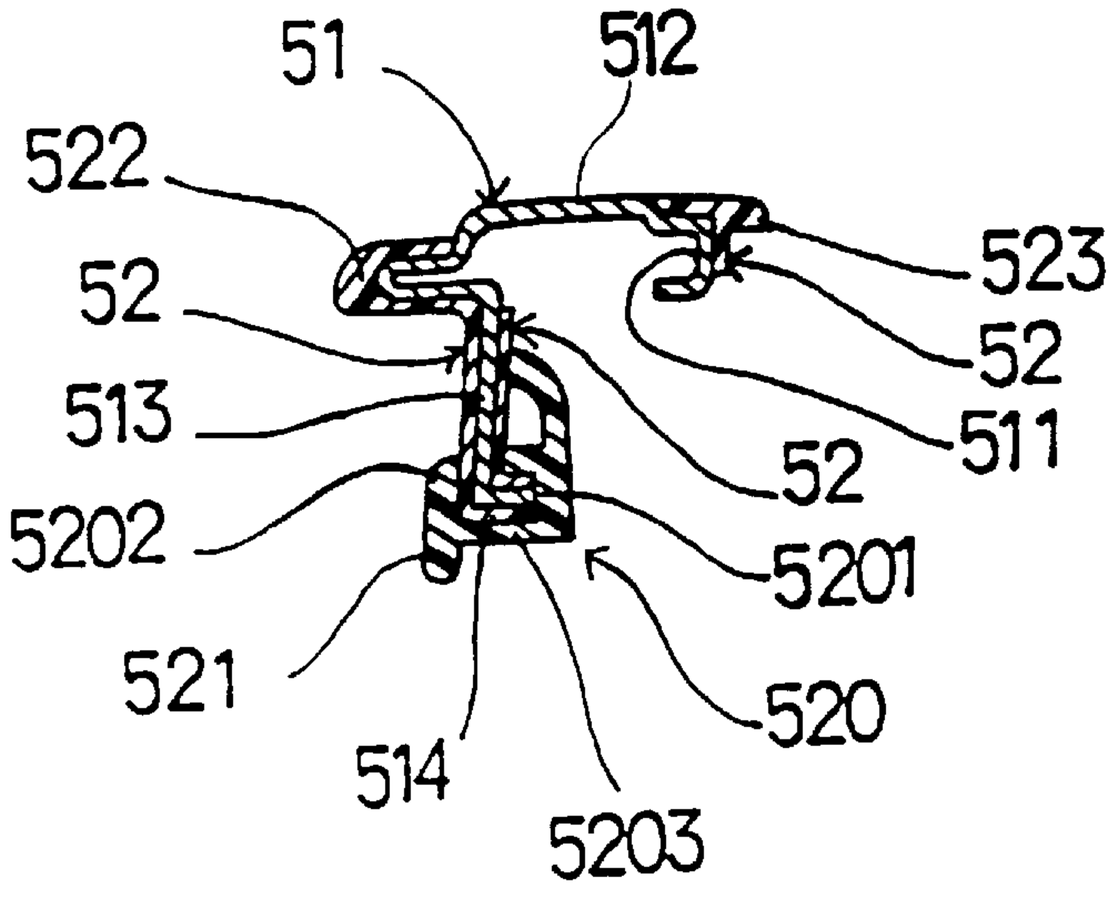
513
514
520
52

FIG.28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512
522
523
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511
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5202
5201
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520
514
5203

FIG.29

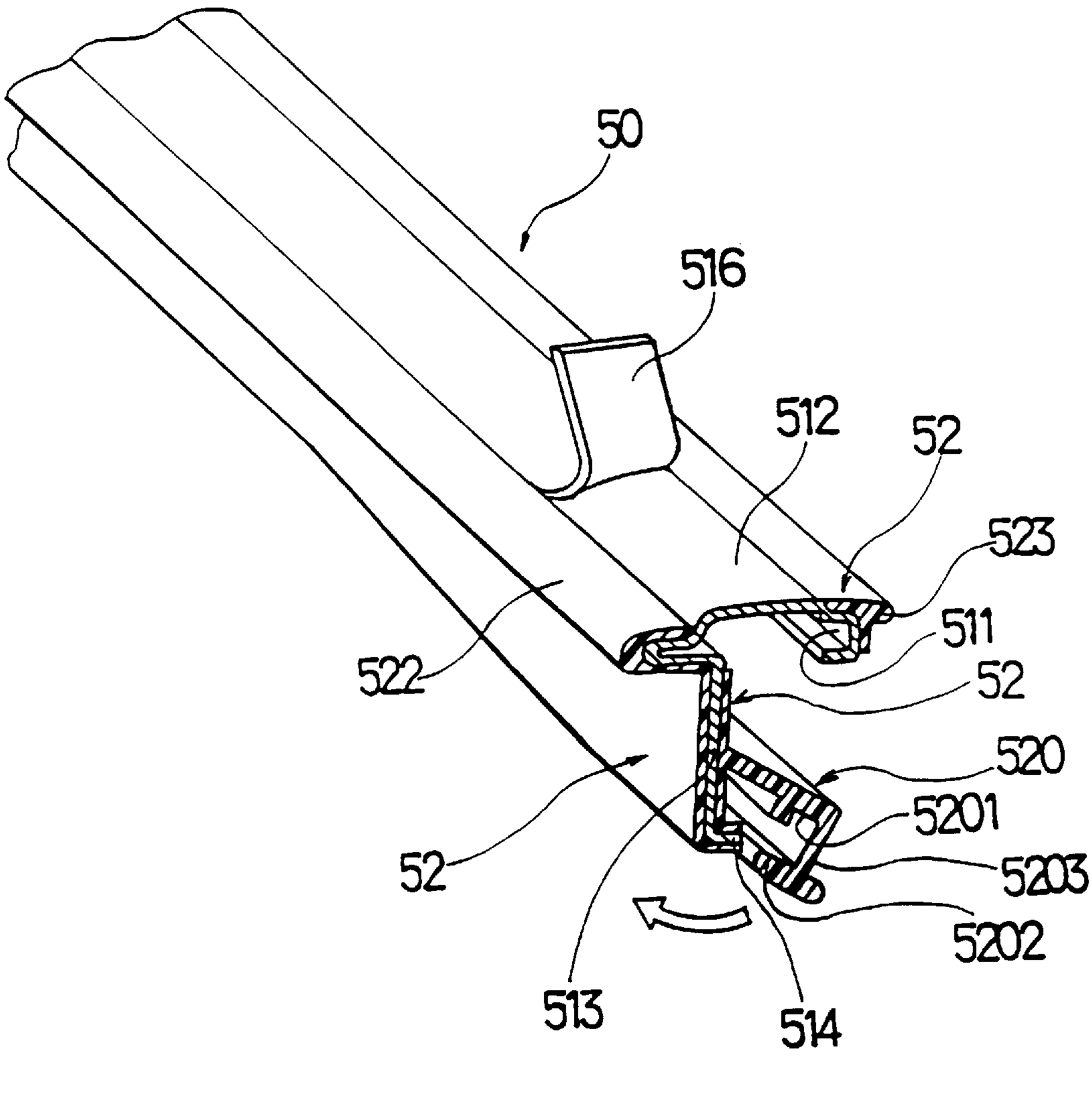

FIG.30

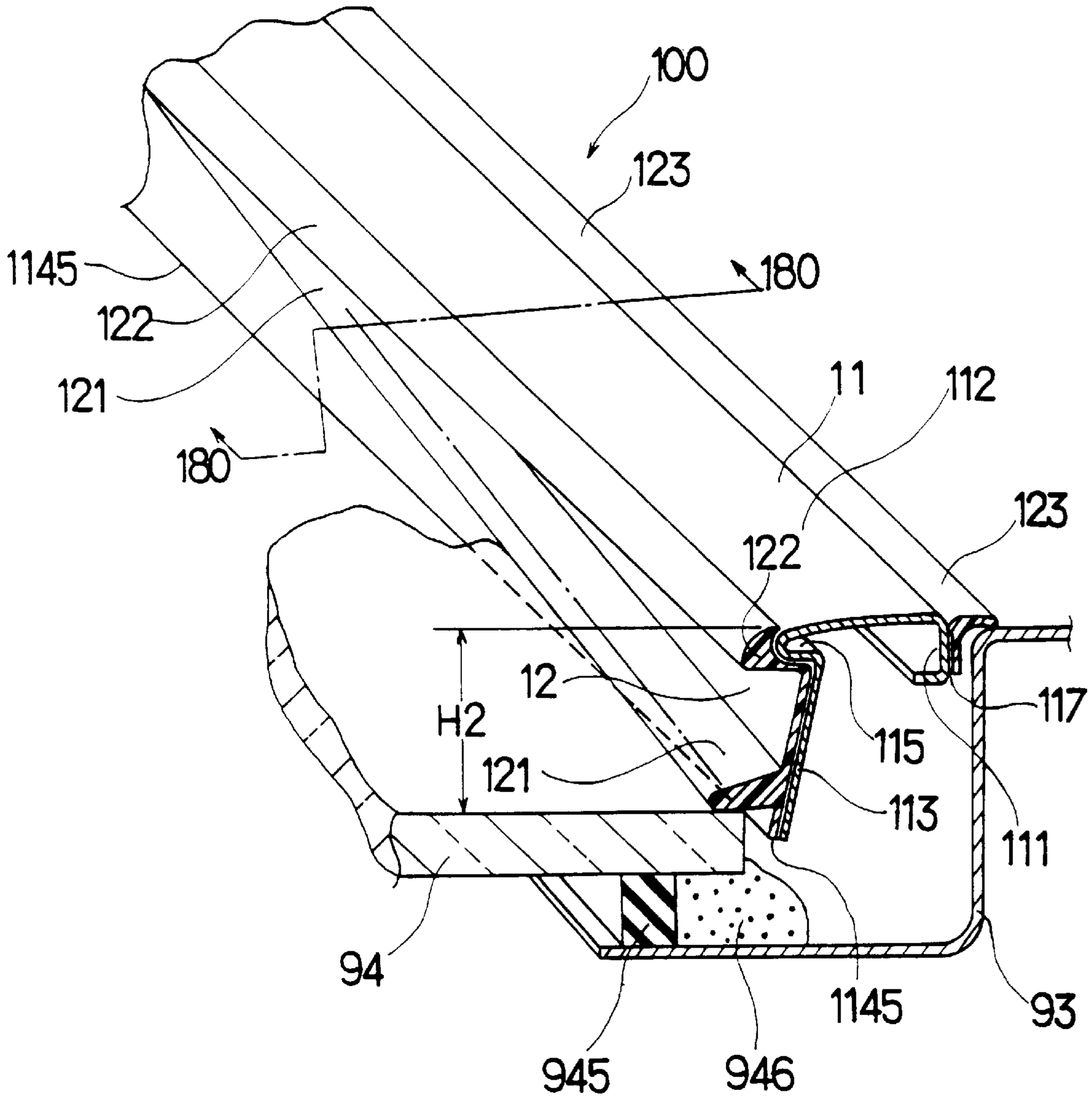
100
123
1145
180
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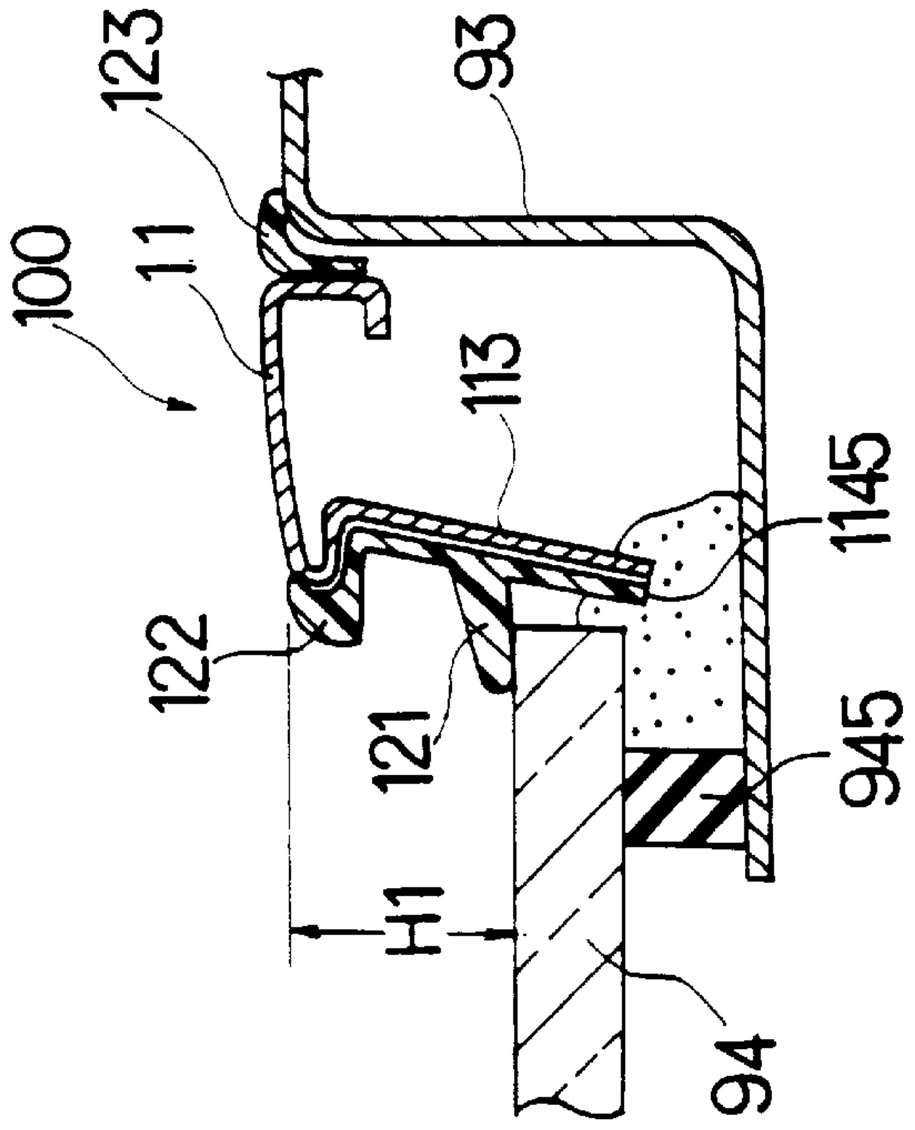
FIG.31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100
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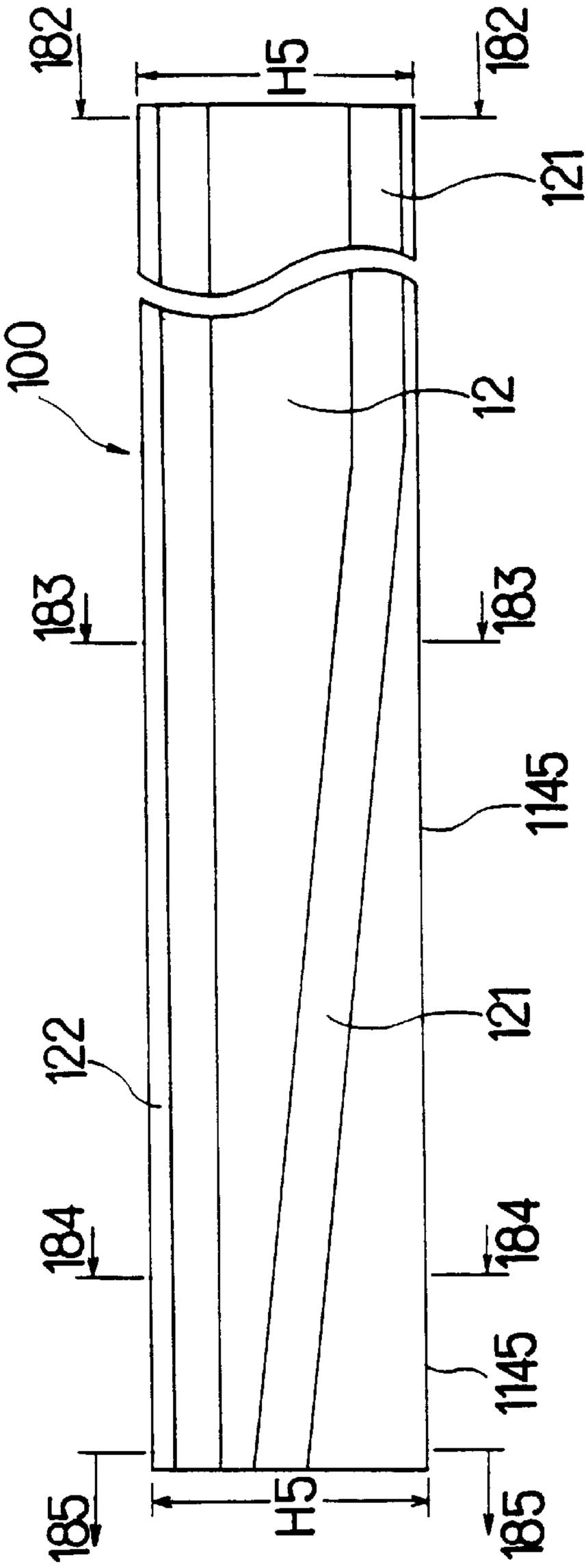
122
121
945
H1
94

FIG.32


182
H5
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121
100
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184
1145
185
H5
185

FIG.33

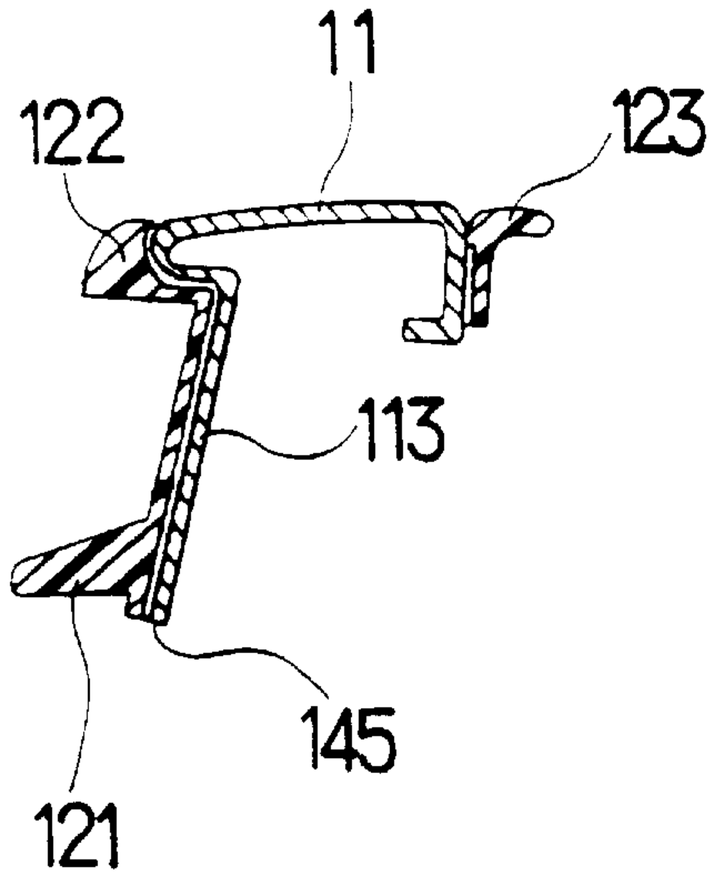


FIG.34

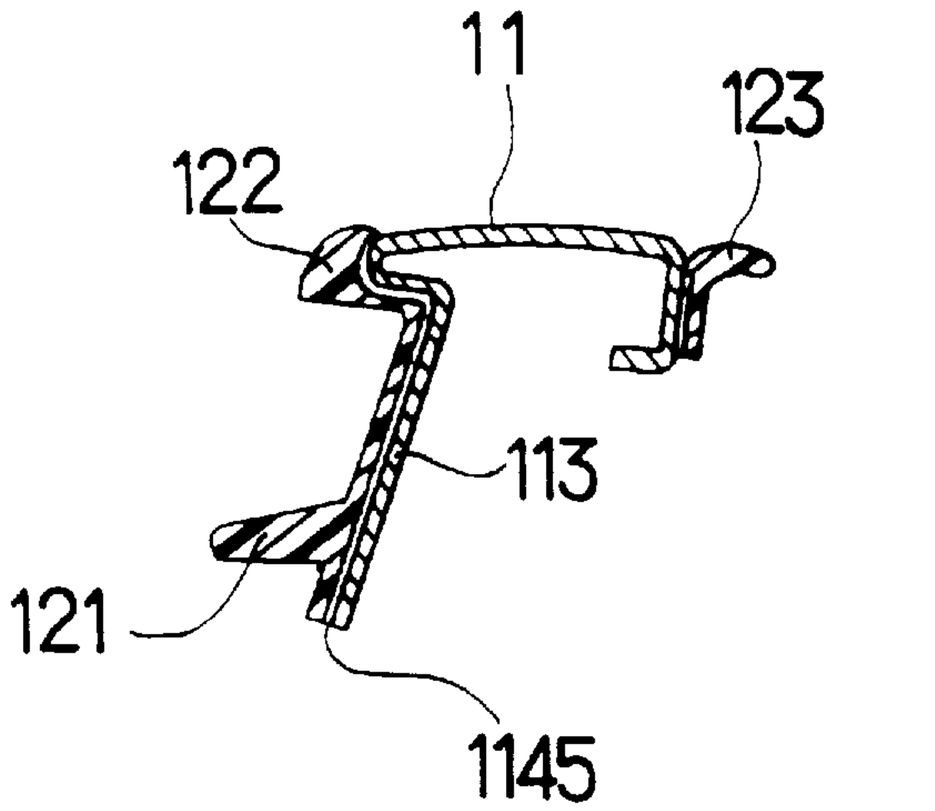


FIG.35

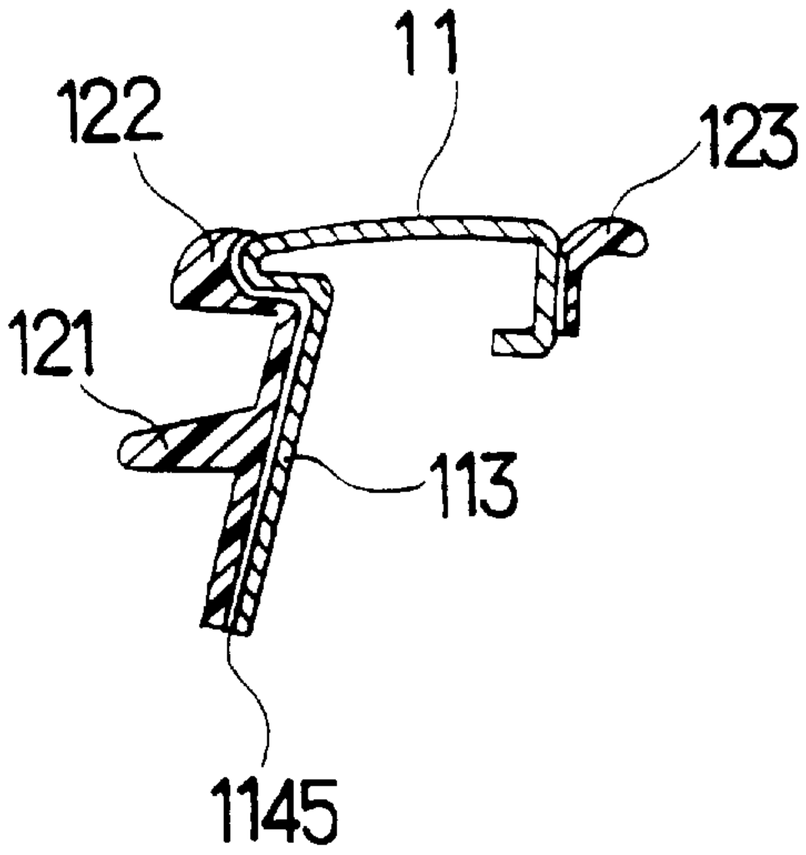


FIG.36

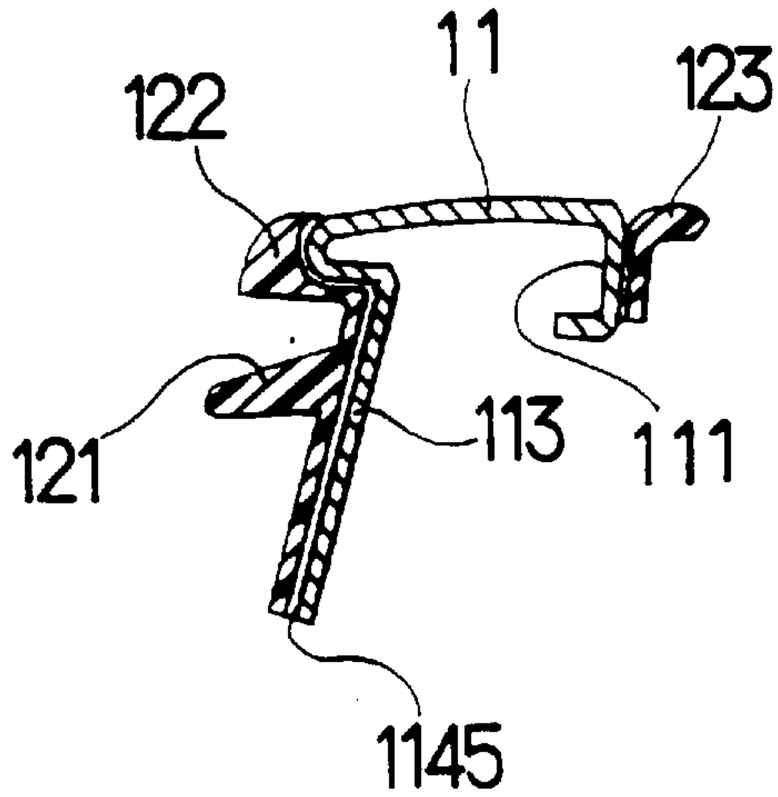
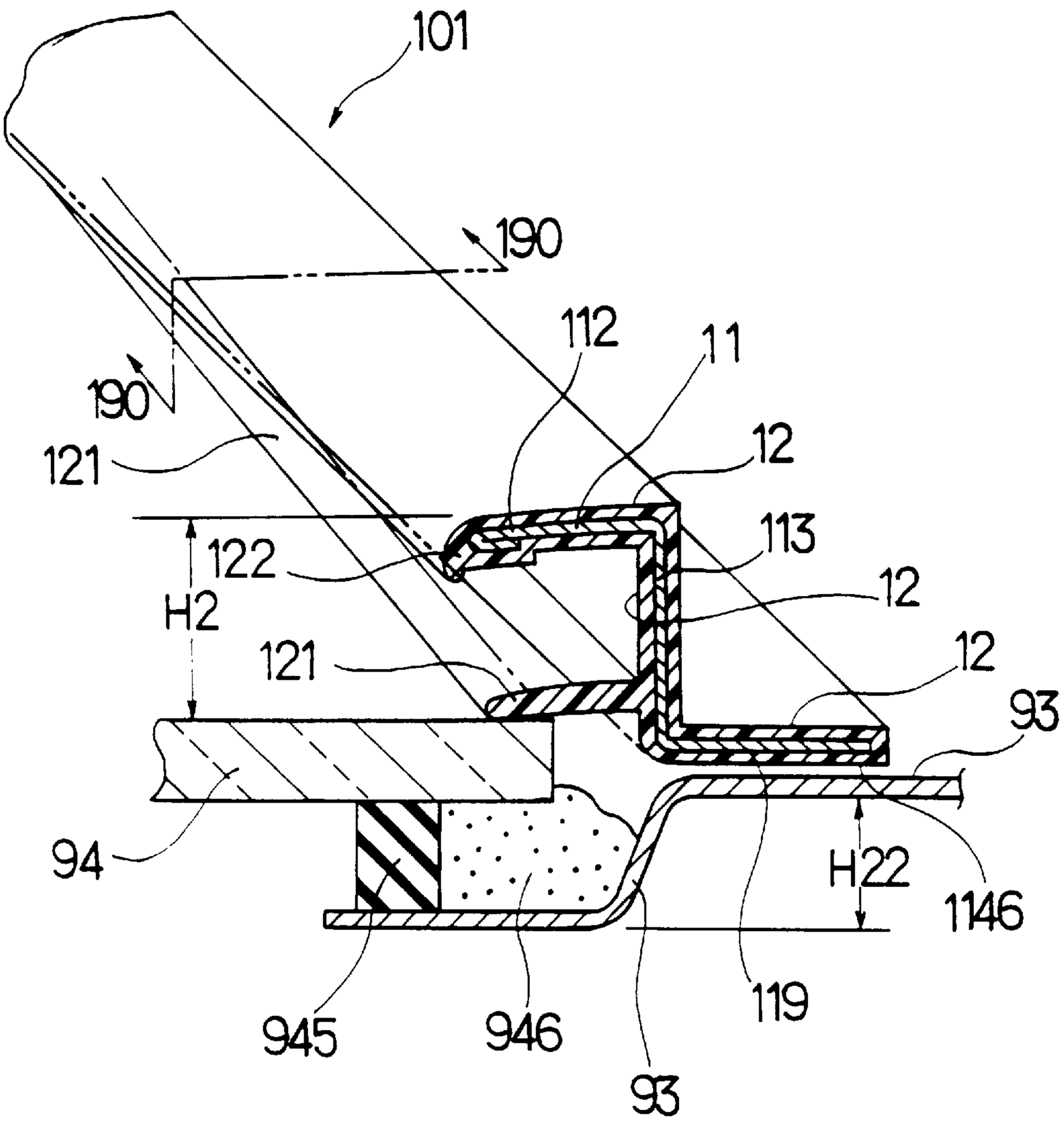


FIG.37


101
190
190'
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H2
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H22
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946
119
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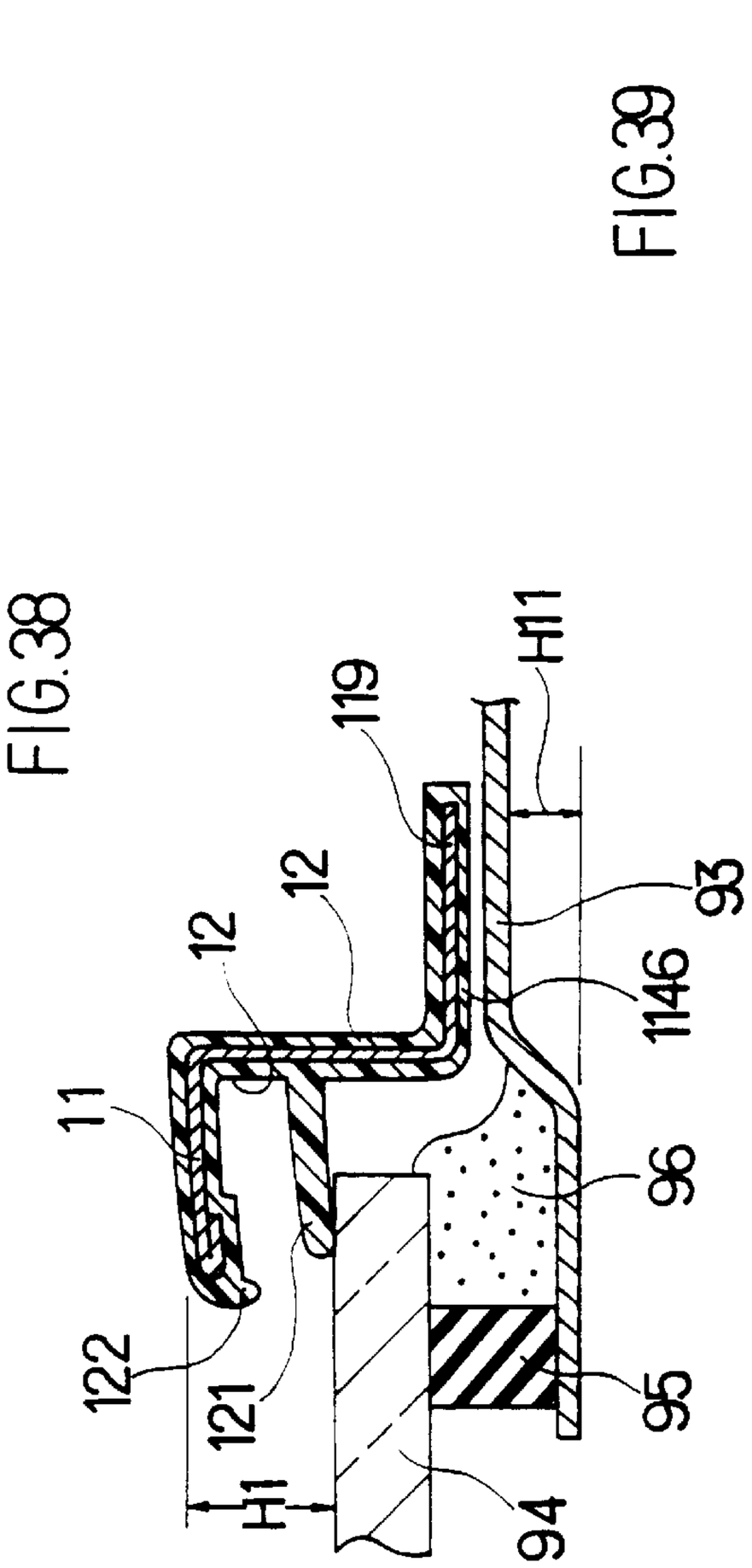
FIG.38


119
H11
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1146
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121
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H1
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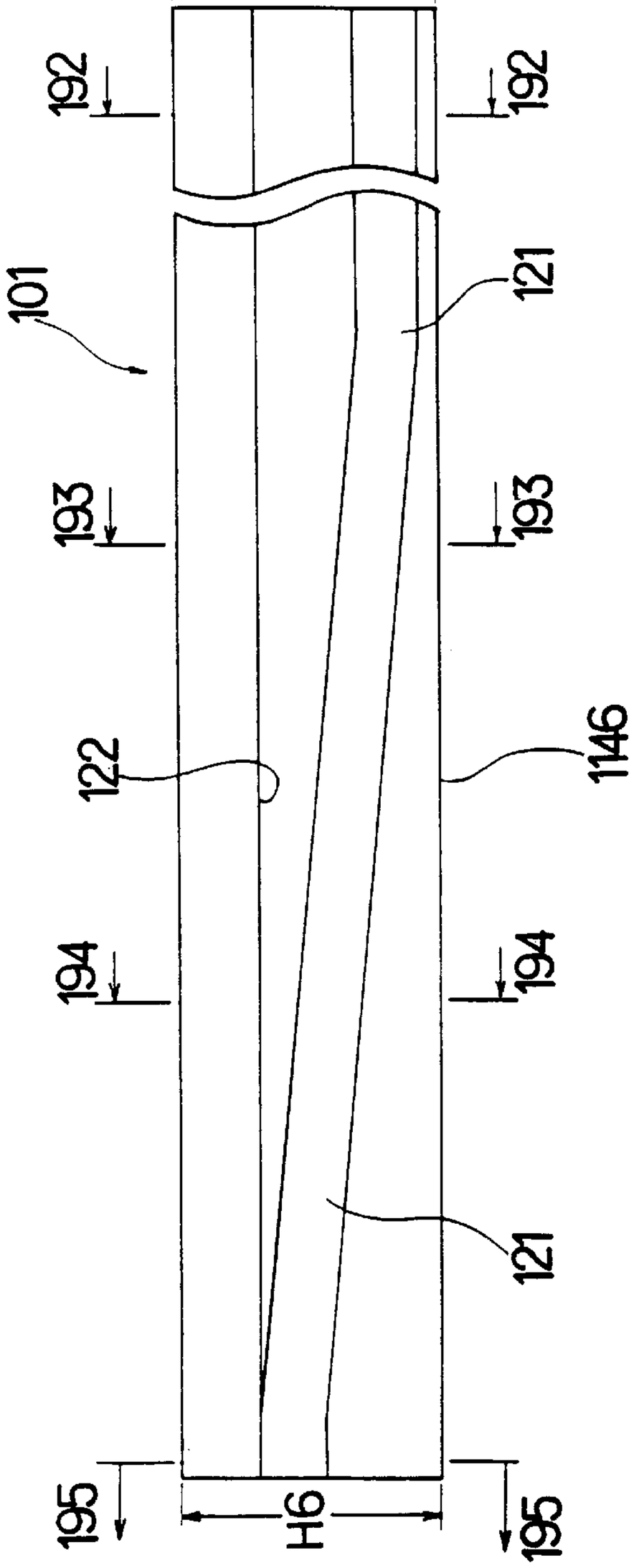
FIG.39


H6
192
192
101
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122
1146
194
194
121
195
H6
195

FIG.40

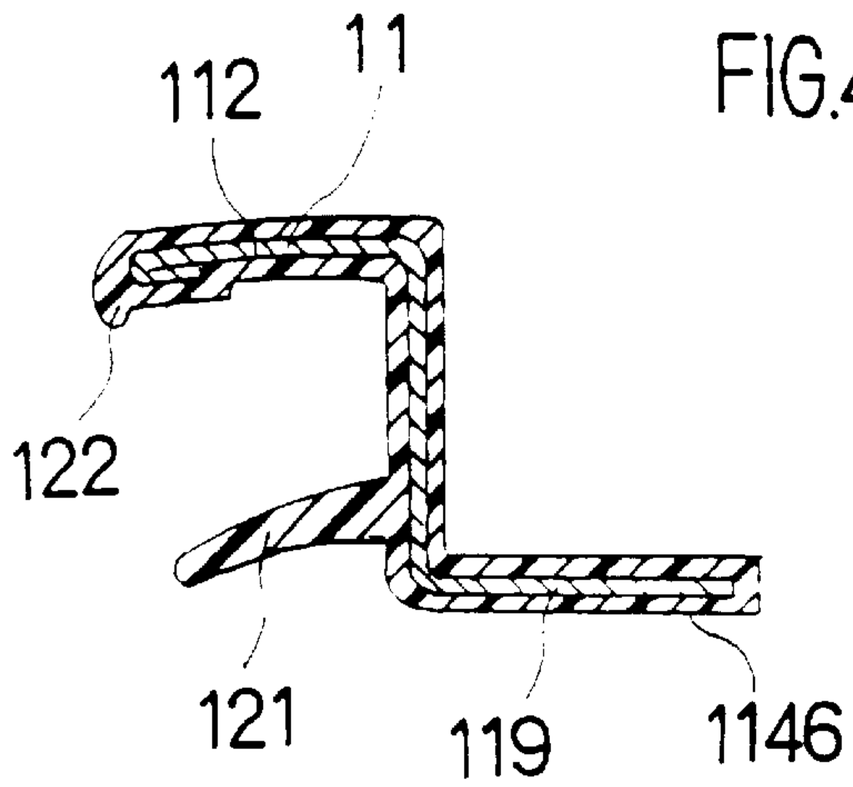


FIG.41

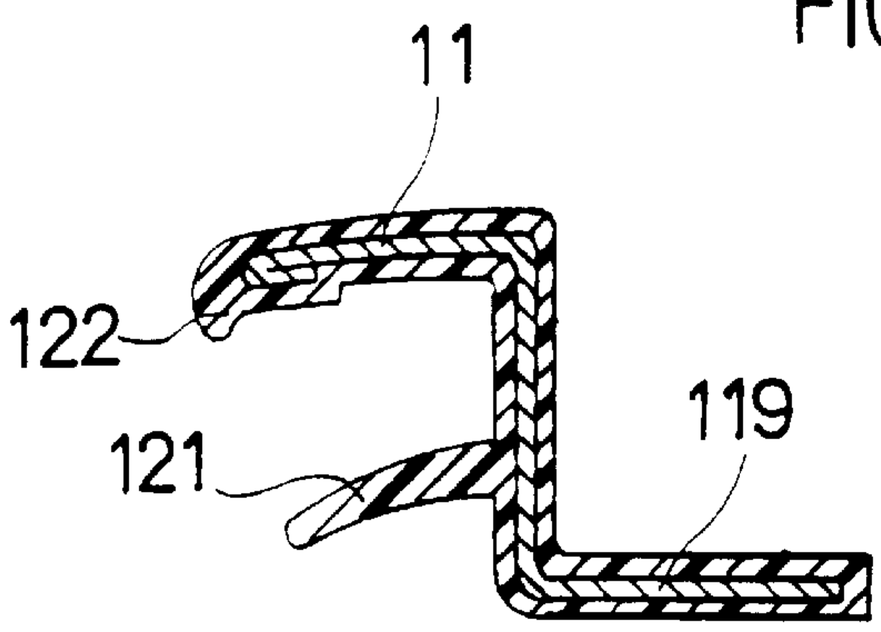


FIG.42

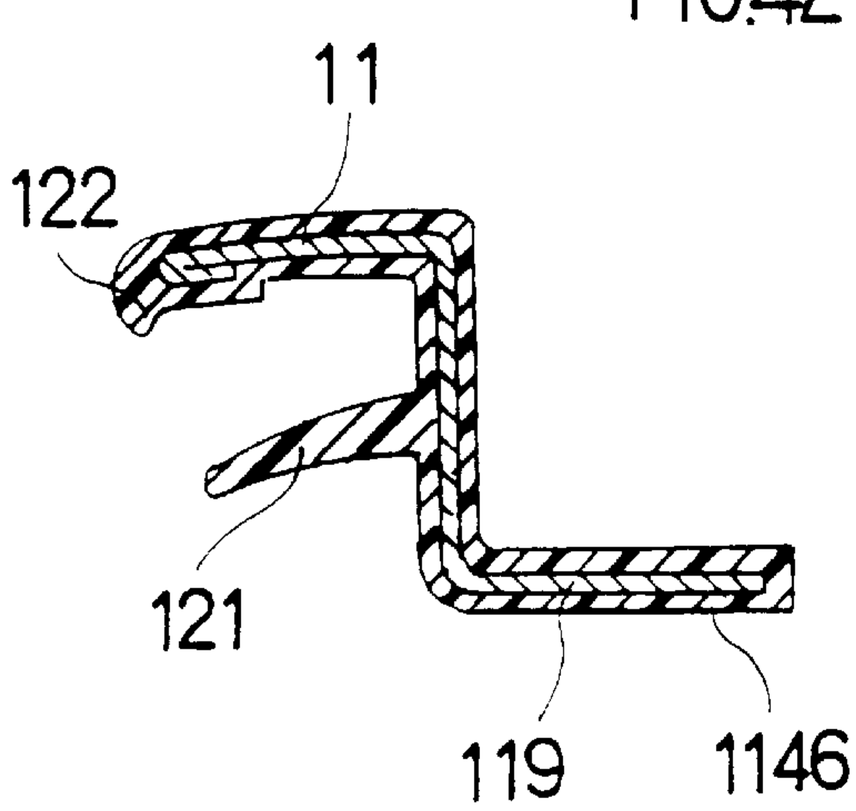


FIG.43

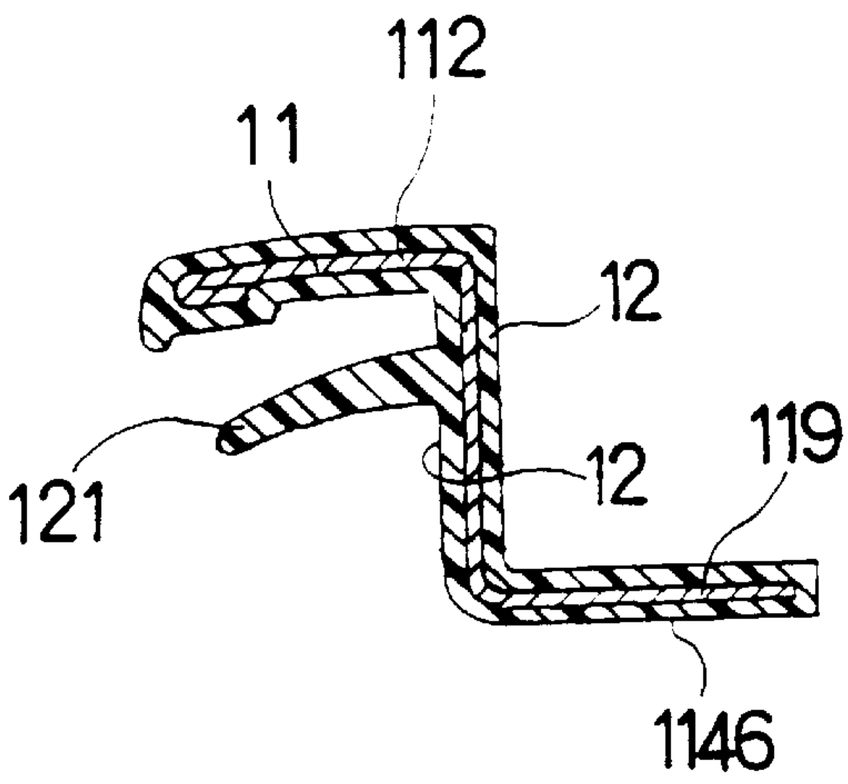


FIG.44

(PRIOR ART)

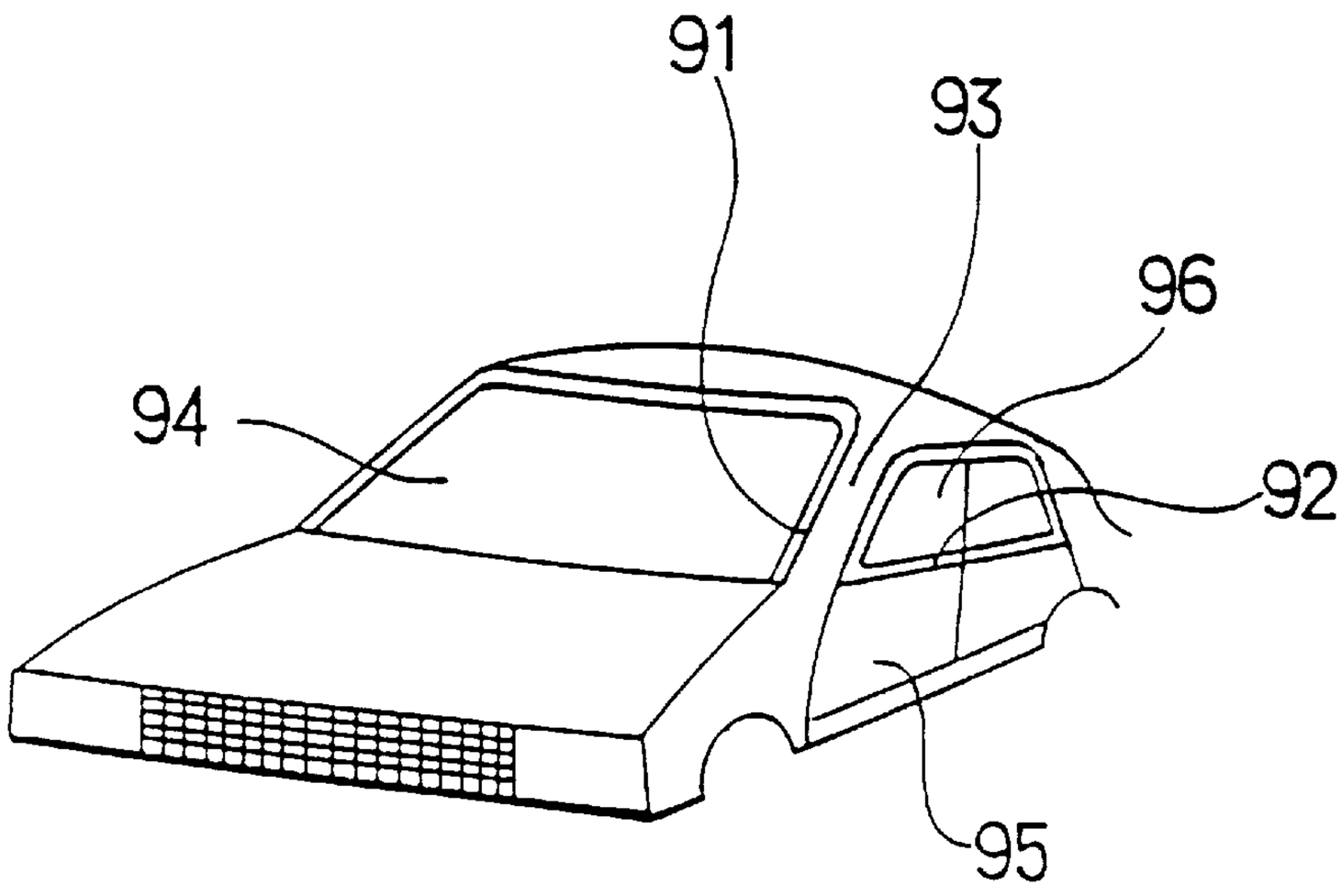
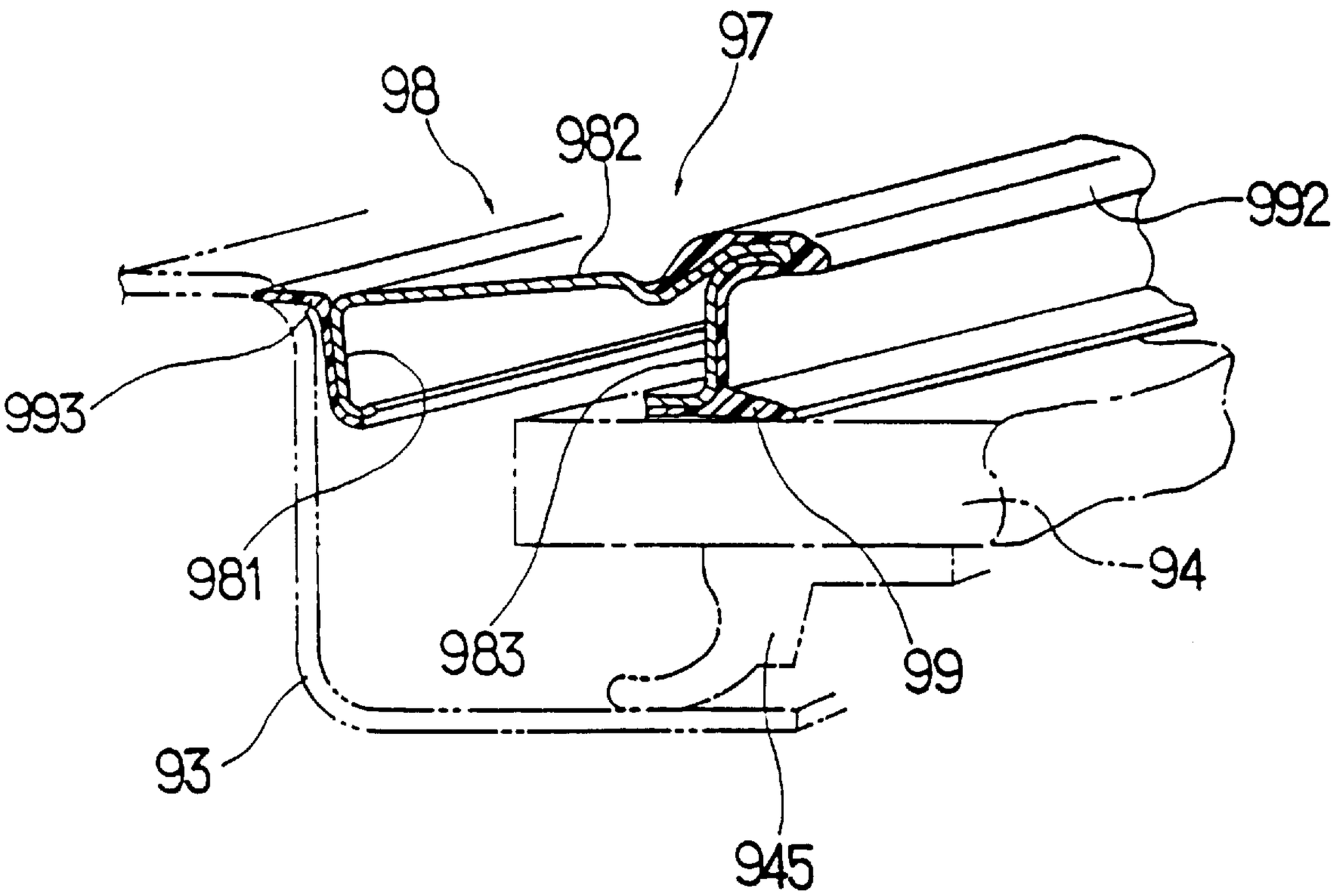


FIG.45
(PRIOR ART)



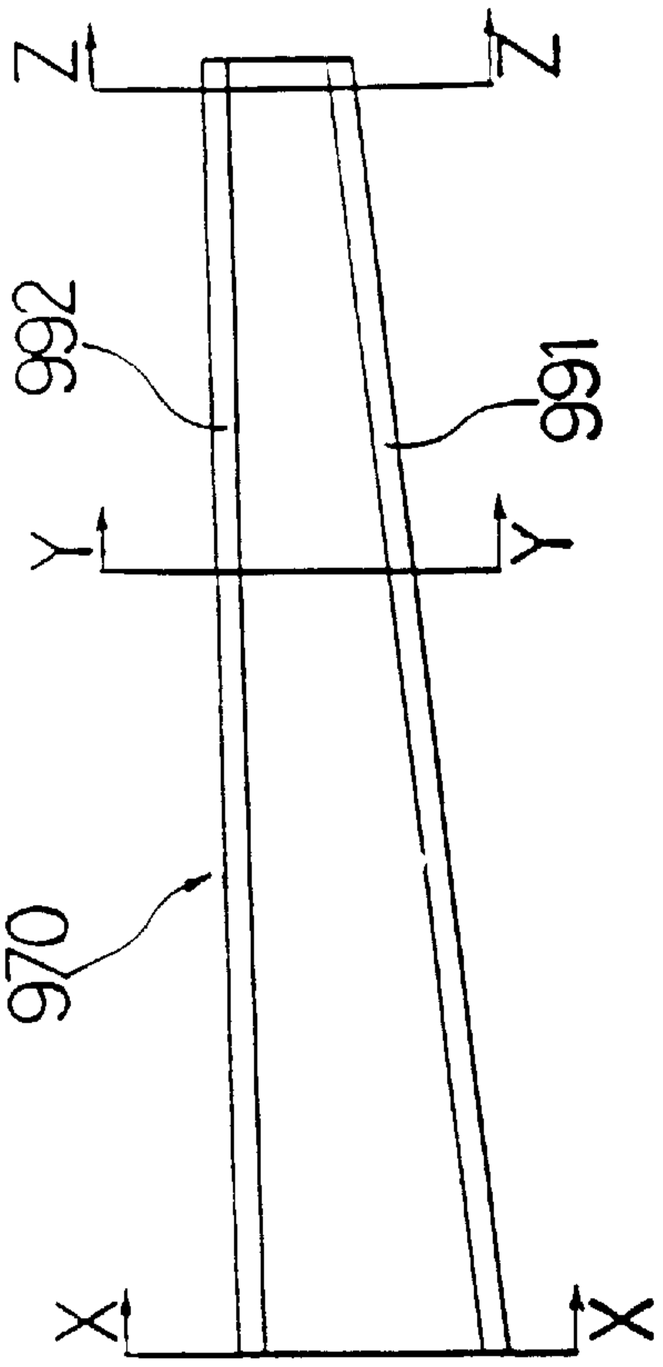


FIG.46 (PRIOR ART)

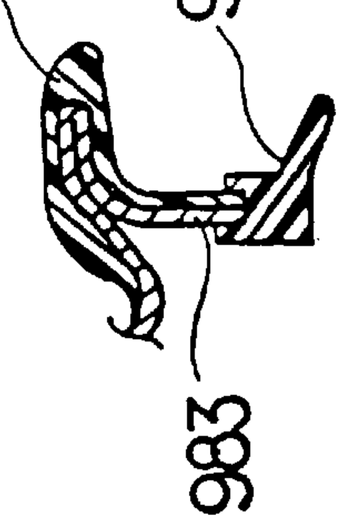


FIG.49 (PRIOR ART)

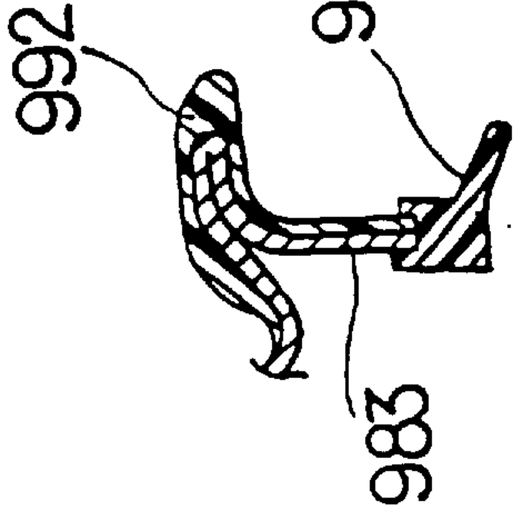


FIG.48 (PRIOR ART)

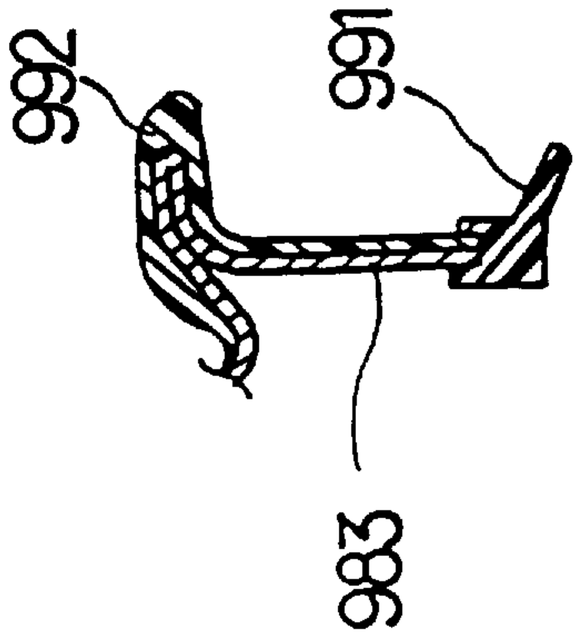


FIG.47 (PRIOR ART)

MOLDING AND METHOD OF PRODUCING THE SAME

This is a division of application Ser. No. 08/130,392 filed on Oct. 1, 1993, now U.S. Pat. No. 5,534,316, which is a division of application Ser. No. 07/781,374 filed on Oct. 23, 1991, now U.S. Pat. No. 5,281,291.

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a molding for vehicles and, more particularly, to a molding with the cross-section thereof varying in the longitudinal direction and a method of producing such a molding.

2. Description of the Related Art

In automobiles, moldings such as a window molding **91** and a door outer molding **92** are generally mounted, as shown in FIG. **44**. The window molding **91** is mounted along the border pillar **93** and a window glass **94**. The door outer molding **92** is mounted along the border between a door **95** and a door glass **96**.

Each of these moldings is composed of a support strip and resin portions, as will be described later, and a protector is provided in the longitudinal direction of the support strip. (See, for example, Japanese Utility Model Publication Nos. 31531/1986 and 14488/1989.)

As shown in FIG. **45**, a conventional molding **97** is provided with a support strip **98** and a protector **99** of a synthetic resin which is provided in the longitudinal direction of the support strip **98**. The support strip **98** is composed of a mounting portion **981**, an outer piece **983** and a top portion **982** which connects the mounting portion **981** and the outer piece **983**. The support strip **98** is provided with a lip **993** at the mounting portion **981** and a water guide **992** at the upper portion of the outer piece **983**. The outer piece **983** in this molding **97** has the same height at any portion. In other words, the section of the molding **97** has the same configuration at any portion in the longitudinal direction.

The protector **99** comes into contact with the window glass **94** when it is mounted on the pillar **93** of the vehicle body, as shown in FIG. **45**, so that the protector **99** has a sealing function for preventing raindrops on the window glass **94** from entering the inside of the car. In FIG. **45**, the reference numeral **945** denotes a sealing rubber provided between the pillar **93** and the window glass **94**.

In order to produce the molding **97**, the protector **99**, the lip **993** and the water guide **992** are integrally provided with the support strip **98** having a substantially U-shaped cross-section by insert extrusion.

With a view to improving the function of shedding rainwater on the window glass **94** and improving the design of the molding, a molding **970** such as those shown in FIGS. **46** to **49** is used in which the height of the outer piece **983** is varied along the length of the molding **970**. The shape of the cross-section of the molding **970** is varied along the length of the molding **970**, as shown in FIGS. **47** to **49**. The height of the outer piece **98** of the support strip **98** is also varied.

When the molding **970** is produced, the support strip **98** having a substantially U-shaped cross-section is first prepared, and the water guide **992** and the lip **993** are integrally provided with the support strip **98** by insert extrusion. A part (lower portion) of the outer piece **983** of the support strip **98** is thereafter cut away so that the height of the outer strip **983** is, continuously decreased. A protector

991 which has been produced separately from the molding **970** is bonded to the lower end portion of the outer piece **983**.

In the above-described conventional method of producing a molding, since it is necessary to produce the protector **991** separately from the molding **970** and to bond the protector **991** with the molding **970**, the number of steps is increased, resulting in the rise in the cost. When the protector **991** is bonded with the molding **970**, the deviation in the longitudinal position of the protector **991** and the overflow of the adhesive may be caused, which aesthetically impair the design of the molding.

The molding **970** may be produced by disposing the support strip **98** having various shapes of cross-sections in the injection molding die, and integrally molding the protector, lip and water guide with the support strip **98** by injection molding.

In the case of producing a long molding by this method, however, a large-sized injection molding die is required, which leads to a high manufacturing cost. In addition, since a burr is produced between the molding and the protector, the aesthetic external appearance of the molding is impaired.

SUMMARY OF THE INVENTION

Accordingly, it is an object of the present invention to eliminate the above-described problems in the related art and to provide a molding which allows a protector to be integrally formed therewith along the lower portion of the outer piece with the height thereof varying without impairing the anesthetic external appearance and which is easy to manufacture, and to provide a method of producing such a molding which facilitates the production of a molding.

To achieve this aim, the present invention provides a molding with the cross-section thereof varying in the longitudinal direction, the molding comprising: a support strip; and a protector provided along the length of the support strip so as to bring the molding into contact with a window glass; the support strip including a mounting portion, an outer piece with the height thereof varying along the length of the support strip and a top portion for connecting the mounting portion and the outer piece; and the protector being integrally provided with the outer piece of the support strip at the lower portion thereof by extrusion molding.

Other features and advantages of the present invention will be apparent from the following description and the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGS. **1** to **12** show a first embodiment of a molding according to the present invention and a method of producing the same, wherein

FIG. **1** is a perspective view of a molding;

FIG. **2** is a sectional view of the molding shown in FIG. **1**, taken along the line A—A;

FIG. **3** is a sectional view of the molding shown in FIG. **1**, taken along the line B—B;

FIG. **4** is a sectional view of the molding shown in FIG. **1**, taken along the line C—C;

FIG. **5** is a sectional view of the molding shown in FIG. **1**, taken along the line D—D;

FIG. **6** is a perspective view of the molding shown in FIG. **1** in the state of being mounted on the front window of an automobile;

FIG. **7** is a perspective view of a metal sheet partially coated with a protective film;

FIG. **8** is a perspective view of a support strip having a constant cross-section produced by continuous forming of a metal sheet;

FIG. **9** is a perspective view of the support strip shown in FIG. **8** with an adhesive applied in advance to the molding position of resin portions;

FIG. **10** is a perspective view of the support strip having the resin portions integrally provided therewith by extrusion molding;

FIG. **11** is a perspective view of the molding having the lower portion of the outer piece cut away along the protector of the extrusion molded molding member;

FIG. **12** is a side elevational view of an extrusion molding die;

FIGS. **13** to **26** show a second embodiment of a molding according to the present invention and a method of producing the same, wherein

FIG. **13** is a perspective view of a molding;

FIG. **14** is a sectional view of the molding shown in FIG. **13**, taken along the line E—E;

FIG. **15** is a sectional view of the molding shown in FIG. **13** taken along the line F—F;

FIG. **16** is a sectional view of the molding shown in FIG. **1**, taken along the line G—G;

FIG. **17** is a perspective view of a metal sheet partially coated with a protective film;

FIG. **18** is a perspective view of the metal sheet shown in FIG. **17** with an adhesive applied in advance to the molding positions of resin portions;

FIG. **19** is a perspective view of a support strip having a constant cross-section produced by continuous forming of a metal sheet;

FIG. **20** is a perspective view of the support strip with the resin portions integrally provided therewith by extrusion molding;

FIG. **21** is a sectional view of the molding shown in FIG. **20**, taken along the line I—I;

FIG. **22** is a perspective view of the molding having the lower portion of the outer piece cut away along the protector of the extrusion molded molding member;

FIG. **23** is a sectional view of the molding shown in FIG. **22**, taken along the line J—J;

FIG. **24** is a perspective view of the molding shown in FIG. **20** with the protector bent in such a manner as to be engaged with the lower portion of the outer piece;

FIG. **25** is a section view of the molding shown in FIG. **24**, taken along the line K—K;

FIG. **26** is a side elevational view of an extrusion molding die;

FIGS. **27** to **29** show a third embodiment of a molding according to the present invention and a method of producing the same, wherein

FIG. **27** is a perspective view of a molding;

FIG. **28** is a sectional view of the molding shown in FIG. **27**, taken along the line M—M;

FIG. **29** is a perspective view of the molding shown in FIG. **27** with the protector bent in such a manner as to be engaged with the lower portion of the outer piece;

FIGS. **30** to **36** show a fourth embodiment of a molding according to the present invention and a method of producing the same, wherein

FIG. **30** is a perspective view of a molding mounted to the front window;

FIG. **31** is a sectional view of the molding shown in FIG. **30**, taken along the line **180—180**;

FIG. **32** is a front view of the molding;

FIG. **33** is a sectional view of the molding shown in FIG. **32**, taken along the line **182—182**;

FIG. **34** is a sectional view of the molding shown in FIG. **32**, taken along the line **183—183**;

FIG. **35** is a sectional view of the molding shown in FIG. **32**, taken along the line **184—184**;

FIG. **36** is a sectional view of the molding shown in FIG. **32**, taken along the line **185—185**;

FIGS. **37** to **43** show a fifth embodiment of a molding according to the present invention and a method of producing the same, wherein

FIG. **37** is a perspective view of the molding mounted to the front window;

FIG. **38** is a sectional view of the molding shown in FIG. **37**, taken along the line **190—190**;

FIG. **39** is a front view of the molding;

FIG. **40** is a sectional view of the molding shown in FIG. **39**, taken along the line **192—192**;

FIG. **41** is a sectional view of the molding shown in FIG. **39**, taken along the line **193—193**;

FIG. **42** is a sectional view of the molding shown in FIG. **39**, taken along the line **194—194**; and

FIG. **43** is a sectional view of the molding shown in FIG. **39**, taken along the line **195—195**;

FIGS. **44** to **49** show conventional moldings, wherein FIG. **44** is a perspective view of an automobile with a molding mounted thereon;

FIG. **45** is a perspective view of the molding shown in FIG. **44** mounted on the automobile; and

FIGS. **46** to **49** show another conventional molding with the cross-section thereof varying in the longitudinal direction, wherein

FIG. **46** is a side elevational view thereof; and

FIGS. **47** to **49** are sectional views thereof, taken along the lines X—X, Y—Y and Z—Z, respectively.

DETAILED DESCRIPTION OF THE INVENTION

The present invention provides a molding with the cross-section thereof varying in the longitudinal direction, the molding comprising: a support strip; and a protector provided along the length of the support strip so as to bring the molding into contact with a window glass; the support strip including a mounting portion, an outer piece with the height thereof varying along the length of the support strip and a top portion for connecting the mounting portion and the outer piece; and the protector integrally provided with the outer piece of the support strip at the lower portion thereof by extrusion molding.

The most characteristic feature of the present invention lies in that the height of the outer piece of the support strip is varied along the length of the support strip and in that the protector is integrally provided with the outer piece of the support strip at the lower portion thereof by extrusion molding.

In a molding of the present invention, the protector is, firmly and integrally provided with the outer piece of the support strip along the lower portion thereof. The protector, lip and water guide are made of a synthetic resin such as a vinyl chloride resin, an ionomer resin and synthetic rubber.

For the support strip, steel sheet, stainless steel sheet, aluminum sheet, etc. are usable. The lower portion of the support strip is preferably bent inwardly into the form of an L, as shown in FIG. **1**. A contacting portion **114** which is integrally formed with the molding and comes into contact with a window glass surface is preferably provided, as shown in FIG. **1**. This contacting portion improves the sealing property for the gap between the molding and the window glass and also prevents the window glass from being damaged.

In a molding of the present invention, the width of the top portion as well as the height of the outer piece of the support strip may be varied along the length of the support strip.

A method of producing a molding including a support strip having an outer piece with the height thereof varying along the length of the support strip and a protector provided at the lower portion of the support strip comprises the steps of: forming a support strip having a constant cross-section by a continuous forming of a metal sheet having a constant width; integrally extrusion molding a protector by an extrusion molding die having a main die and a sub die which is movable along one side of the extrusion orifice so as to mold the protector, while moving the sub die so as to vary the molding position for the protector in the longitudinal direction of the support strip with respect to the outer piece of the support strip; cutting the extruded molding member to a predetermined length; and cutting a part of the outer piece of the support strip off from the molding member along the protector.

The most characteristic feature of the method of producing a molding according to the present invention is that a support strip having a constant cross-section is prepared in advance, the protector is integrally extrusion molded with the outer piece of the support strip by an extrusion die, and the molding member and a part of the lower portion of the outer piece are cut. It is also characteristic of the method of the present invention that the extrusion die used for extrusion molding has a main die and a sub die which is movable along one side of the extrusion orifice so as to mold the protector.

The base of the main die has a shape corresponds to the cross-section of the support strip and the lip, the water guide, etc. which are formed on the outside of the support strip. The sub die has a base for molding the protector at the position outside of the outer piece of the support strip. By moving the position of the base for molding the protector, the molding position for the protector is varied, as shown in FIG. **12**.

In this way, the lip, the water guide and the protector are simultaneously and integrally provided with the support strip. The outer piece at the lower portion of the protector is cut off the insert extruded product obtained in this way, thereby producing a molding of the present invention with the cross-section thereof varying in the longitudinal direction.

The method of producing a molding will be explained in more detail in the following.

A support strip having a constant cross-section is first formed by a continuous forming of a metal sheet having a constant width.

A protector is then integrally formed with an outer piece of the support strip by extrusion molding using an extrusion die. In this case, an extrusion die having a main die and a sub die which is movable along one side of the extrusion orifice so as to mold the protector is used. While moving the sub die so as to vary the position of the protector along the length of the support strip, the protector is integrally molded by extrusion molding.

The extrusion molded molding member is cut to a predetermined length.

The lower portion of the outer piece of the support strip is cut off from the molding member along the protector. In this way, the molding having a support strip with the height of the outer piece thereof varying along the length of the support strip and a protector provided at the lower portion of the outer piece is obtained. In other words, the molding with the cross-section varying in the longitudinal direction and having a protector at the lower portion of the outer piece is obtained.

It is preferable to apply an adhesive such as an acrylic resin and a phenol resin to the portion of the outer surface of the support strip which is integrally molded with the protector and the like prior to extrusion molding, as shown in FIG. **9**.

The molding of the present invention has a function of shielding the window glass from rain water by virtue of the protector, as described above. Since the protector is integrally molded with the molding by extrusion molding, the protector is firmly bonded to the support metal and it is excellent from the point of view of design.

According to the method of producing a molding of the present invention, it is possible to integrally mold the protector with the support strip while gradually changing the height of the protector with respect to the outer piece of the support strip, thereby facilitating the molding of the protector. By cutting a part of the outer piece at the lower portion of the protector, it is possible to obtain a molding having various cross-sections. In this way, the manufacture of a molding is facilitated.

Thus, according to the present invention, it is possible to provide a molding which is provided with a protector integrally formed therewith along the lower portion of the outer piece with the height thereof varying without impairing the aesthetic external appearance and which is easy to manufacture, and to provide a method of producing such a molding.

The molding of the present invention may have a structure in which the protector has a protector piece integrally extrusion molded with the inner wall surface of the outer piece of the support strip and the protector piece is bent in such a manner as to be engaged with the lower portion of the outer piece, as shown in FIGS. **13** to **29**.

In the molding, the height of the outer piece of the support strip is varied along the length of the support strip and the protector piece is integrally extrusion molded with the inner wall surface of the outer piece. The protector piece is bent and engaged with the lower portion of the outer piece, thereby forming the protector.

In this molding, the protector is integrally formed with the support strip in such a manner as to be firmly engaged with the lower portion of the outer piece of the support strip.

A steel sheet, stainless steel sheet, aluminum sheet, etc. are usable for the support strip. If a stainless steel sheet is used, it is possible to form a "shining ornamental surface" on the surface of the support strip. In the molding, the protector piece is formed on the inner surface of the outer piece and the protector piece is engaged with the lower portion of the outer piece, thereby forming the protector. It is therefore easy to form a "shining ornamental surface" on the outer wall surface of the outer piece.

The lower portion of the outer piece of the support strip is preferably bent inwardly into the form of an L, as shown in FIG. **13**. At the lower end portion of the outer piece bent

in this manner is formed an engaging bent portion which engages the protector piece. It is preferable that the protector piece is provided with an engaging groove portion which engages with the engaging bent portion so as to regulate the vertical movement of the protector piece and a protector portion which regulates the horizontal movement of the protector piece in cooperation with the engaging groove portion, as shown in FIGS. **14** and **15**.

The protector piece is also preferably provided with a contacting member in correspondence with the undersurface of the engaging bent portion, as shown in FIG. **28**. The contacting member improves the sealing property for the gap between the molding and the window glass and also prevents the window glass from being damaged.

In a molding of the present invention, the width of the top portion of the outer piece as well as the height of the outer piece may be varied along the length of the support strip.

A method of producing a molding including a support strip having an outer piece with the height thereof varying along the length of the support strip and a protector provided at the lower portion of outer piece and having a protector piece comprises the steps of: forming a support strip having a constant cross-section by a continuous forming of a metal sheet having a constant width; integrally extrusion molding the protector piece by an extrusion molding die having a main die and a sub die which is movable along one side of the extrusion orifice so as to mold the protector, while moving the sub die so as to vary the molding position for the protector piece in the longitudinal direction of the support strip with respect to the inner wall surface of the outer piece of the support strip; cutting the extrusion molded molding member to a predetermined length; cutting a part of the outer piece of the support strip off from the molding member along the protector piece; and bending the protector piece in such a manner as to be engaged with the lower portion of the outer piece, thereby forming the protector.

The most characteristic feature of this method of producing a molding according to the present invention is that a support strip having a constant cross-section is prepared in advance, the protector piece is integrally extrusion molded with inner wall surface of the outer piece of the support strip by an extrusion die, and the molding member and a part of the lower portion of the outer piece are cut. It is also characteristic of the method of the present invention that the extrusion die used for extrusion molding has a main die and a sub die which is movable along one side of the extrusion orifice so as to mold the protector piece.

The base of the main die has a shape corresponds to the cross-section of the support strip and the lip, the water guide, etc. which are formed on the outside of the support strip. The sub die has a base for molding the protector piece at the position inside of the outer piece of the support strip. By moving the position of the base for molding the protector piece, the molding position for the protector piece is varied, as shown in FIG. **26**.

In this way, the lip, the water guide and the protector are simultaneously and integrally provided with the support strip. The outer piece at the lower portion of the protector piece is cut off the insert extruded product obtained in this way, and the protector piece is bend in such a manner as to be engaged with the lower portion of the protector piece, thereby producing a molding of the present invention with the cross-section thereof varying in the longitudinal direction.

The method of producing a molding will be explained in more detail in the following.

A support strip having a constant cross-section is first formed by a continuous forming of a metal sheet having a constant width.

A protector piece is then integrally formed with the inner wall surface of an outer piece of the support strip by extrusion molding using an extrusion die. In this case, an extrusion die having a main die and a sub die which is movable along one side of the extrusion orifice so as to mold the protector piece is used. While moving the sub die so as to vary the position of the protector piece along the length of the support strip with respect to the inner wall surface of the outer piece of the support strip, the protector piece is molded by extrusion molding.

The extrusion molded molding member is cut to a predetermined length.

The lower portion of the outer piece of the support strip is cut off from the molding member along the protector piece. The protector piece is bent in such a manner as to be engaged with the lower portion of the outer piece and the protector is formed. In this way, the molding having a support strip with the height of the outer piece thereof varying along the length of the support strip and a protector provided at the lower portion of the outer piece is obtained. In other words, the molding with the cross-section varying in the longitudinal direction and having a protector at the lower portion of the outer piece is obtained. It is easy to form a "shining ornamental surface" on the outer piece of the support strip.

It is preferable to apply an adhesive such as an acrylic resin and a phenol resin or paste an adhesive sheet to the portion of the support strip which is integrally molded with the protector and the like prior to extrusion molding, as shown in FIG. **19**.

The molding of the present invention has a function of shielding the window glass from rain water by virtue of the protector, as described above. Since the protector is integrally molded with the molding by extrusion molding, the protector is firmly bonded to the support metal and it is excellent from the point of view of design.

According to the method of producing a molding of the present invention, it is possible to integrally mold the protector with the support strip while gradually changing the height of the protector with respect to the outer piece of the support strip, thereby facilitating the molding of the protector. By cutting a part of the outer piece at the lower portion of the protector piece and engaging the protector piece with the lower portion of the outer piece, thereby forming the protector, it is possible to obtain a molding having various cross-sections. In this way, the manufacture of a molding is facilitated.

Thus, according to the present invention, it is possible to provide a molding which is provided with a protector integrally formed therewith along the lower portion of the outer piece with the height thereof varying without impairing the aesthetic external appearance and which is easy to manufacture, and to provide a method of producing such a molding.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Embodiment 1

The first embodiment of a molding and a method of producing the molding according to the present invention will be explained with reference to FIGS. **1** to **12**. The molding of this embodiment is applied to a window molding, as shown in FIG. **30**.

The molding **1** of this first embodiment is composed of a support strip **11** and a protector **121** provided in the longitudinal direction of the support strip **11**, as shown in FIG. **1**. The support strip **11** is composed of a mounting portion **111**, an outer piece **113** and a top portion **112** for connecting the mounting portion **111** and the outer piece **113**. As shown in FIGS. **1** to **5**, the height of the outer piece **113** varies along the length of the support strip **11**. The protector **121** is integrally provided with the outer piece **113** of the support strip **11** at the lower portion thereof by extrusion molding.

The support strip **11** is composed of the top portion with a fixed width and the outer piece **113** having a varying height and the cross-section of the support strip **11** varies in the longitudinal direction.

The outer piece **113** has a height of H1, as shown in FIGS. **1** and **2**, a height of H2, as shown in FIGS. **1** and **5**, and a height varying in the range of H1 to H2 over the length of L, as shown in FIGS. **1**, **3** and **4**.

The lower portion of the outer piece **113** is bent inwardly so as to form a glass contacting portion **114**, and the upper portion of the outer piece **113** is bent outwardly so as to project sideways, thereby forming a guide portion **115** at which a water guide **122** is provided.

The protector **121** is provided at a resin portion **12** along the length of the support strip **11**. That is, the molding **1** is composed of the support strip **11** and the resin portions **12** which are integrally extrusion molded with the surfaces of the mounting portion **111** and the outer piece **113** of the support strip **11** through an adhesive **117**. A lip **123** is provided on the resin portion **12** formed on the mounting portion **111** in such a manner as to project from the support strip **11**. The lip **123** is provided so as to seal the gap between the molding **1** and a pillar **93**, as shown in FIG. **6**.

The protector **121** and the water guide **122** are provided in such a manner as to project from the support strip **11** at the lower portion and the upper portion, respectively, of the resin portion **12** provided on the outer piece **113**. The protector **121** has a function of sealing the gap between the molding **1** and a window glass **94** and preventing the direct contact between the support strip **11** and the window glass **94**. The glass contacting portion **114** at the lower portion of the outer piece **113** is provided on the underside thereof with a resin plate portion **1210** integrally provided with the resin portion **12**.

An extrusion die **2** used for the extrusion molding of the resin portions **12** is shown in FIG. **12**. The extrusion die **2** has a main die **21** and a sub die **22** for molding a protector. The main die **21** and the sub die **22** have extrusion orifices **210**, **220**, respectively. The sub die **22** is movable along one side of the extrusion orifice **210** which corresponds to the outer piece **113**.

The inner surface of the extrusion orifice **210** has the same shape as that of the inside of the mounting portion **111**, the top portion **112** and the outer piece **113** of the support strip **11**, and the outer surface of the extrusion orifice **210** has the same shape as that of the water guide **122**, the lip **123**, etc. of the resin portions **12**. The portion between the extrusion orifice and the top portion **112** is a hollow portion.

The main die **21** has in the inside thereof a recessed portion which communicates with one side of the extrusion orifice **210**. The recessed portion **211** is longer than the sub die **22** by the length which is equivalent to the amount of movement of the sub die **22**. The amount H3 of movement of the sub die **22** is determined by the variation of change in the height of the outer piece **113**, namely, (H2-H1).

The sub die **22** is inserted into the recessed portion **211** so as to be movable. A die guide **23** is provided between the main die **21** and the sub die **22** in the direction of the movement of the sub die **22**. A feeding rod **221** is extended from the base portion of the sub die **22** in parallel to the direction of the movement of the sub die **22**, and the feeding rod **221** is connected to a converter **24**. The shaft **251** of a driving motor **25** is connected to the converter **24**, and the converter **24** converts the rotational movement of the shaft **251** into the linear movement of the feeding rod **221**. The converting mechanism may use a ball screw, for example, instead.

A method of producing the molding **1** will now be explained with reference to FIGS. **7** to **12**.

The surface of a metal sheet **110** having a constant width is first partially coated with a protective film **116** as shown in FIG. **7**. The protective **116** film protects the surface of the metal sheet **110** when it is formed into the support strip **11**, as shown in FIG. **8**.

The metal sheet **110** is then formed into the support strip **11** composed of the mounting portion **111**, the top portion **112** and the outer piece **113**, as shown in FIG. **8**, by roll forming (not shown). At this time the support strip **11** has a constant cross-section. The protective film **116** at the top portion is stripped after the continuous forming of the support strip **11**.

The adhesive **117** is, in advance, applied to the positions of the support strip **11** at which the resin portions **12** are extrusion molded, as shown in FIG. **9**. In other words, the adhesive **117** is applied to the mounting portion **111** and the outer piece **113**.

Thereafter, the resin portions **12** are integrally extrusion molded on the support strip **11**, as shown in FIG. **10**, by using the extrusion die **2** shown in FIG. **12**.

At the time of extrusion molding, the support strip **11** is inserted into the main die **21** shown in FIG. **12**. The support strip **11** inserted into the main die **21** is extruded from the extrusion orifices **210**, **220** with the resin portions **12** integrally extrusion molded on the surfaces of the mounting portion **111** and the outer piece **113**. In this way, the lip **123** is formed at the resin portion **12** on the mounting portion **111** of the support strip **11**, as shown in FIG. **10**. In the outer piece **113** of the support strip **11**, the protector **121** is formed at the resin portion **12**. At the guide portion **115** of the outer piece **113**, the water guide **122** is formed at the resin portion **12**.

When the driving motor **25** is driven at the time of extrusion molding, the rotation of the shaft **251** is transmitted to the converter **24**. The converter **24** converts the rotational movement of the shaft **251** into the linear movement of the feeding rod **221**. With the linear movement of the feeding rod **221**, the sub die **22** moves along the die guide **23**. The extrusion orifice **220** of the sub die **22** for molding the protector thereby moves along one side of the extrusion orifice **210** of the main die **21**.

In this way, it is possible to vary the molding position for the protector **121** in the longitudinal direction of the support strip **11** with respect to the outer piece **113** of the support strip **11**.

The thus-extrusion molded molding member **10** is then cut to a predetermined length by using a cutting device (not shown).

The lower portion **1130** of the outer piece **113** of the support strip **11** is cut off from the molding member **10** along the protector **121**, as shown in FIG. **11**. At this time, the cutting position for the lower portion **1130** of the outer piece **113** is varied by the height equivalent to the amount H3

(=H2-H1) of movement of the sub die **22** over the length L. A contacting portion **1140** having a predetermined dimension is left below the protector **121**. The contacting portion **1140** is bent inwardly so as to form the glass contacting portion **114** and the resin plate portion **1210**, as shown in FIG. **1**.

In this way, the molding **1** is obtained which has the top portion **112** with a fixed width, the outer piece **113** having a varying height and the resin portions **12** such as the protector, and the cross-section of which varies in the longitudinal direction of the support strip **11**, as shown in FIGS. **1** to **5**.

The molding **1** obtained in this manner is mounted on a vehicle along the border between the pillar **93** and the window glass **94**, as shown in FIG. **6**. The lip **123** of the molding **1** comes into elastic contact with the pillar **93** and exhibits a sealing function. The protector **121** comes into elastic contact with the window glass **94** and exhibits a sealing function. The protector **121** and the resin plate portion **1210** prevent the direct contact between the support strip **11** and the window glass **94**. The water guide **122** smoothly sheds off rainwater toward the roof during the travel of the vehicle. In FIG. **6**, the reference numeral **945** denotes a seal rubber, and **946** a seal member.

Since the protector **121** and the like are integrally provided with the molding **1** by extrusion molding, as described above, no burr is produced unlike in the prior art. The molding **1** of this embodiment has therefore an excellent appearance. The resin portions **12** such as the protector **121** are firmly bonded to the support strip **11** by integral extrusion molding.

In addition, since it is easy to form the protector **121** in the longitudinal direction of the support strip **11** by extrusion molding, great reduction in manufacturing cost is possible in comparison with a conventional method.

As described above, according to this embodiment, it is possible to produce the molding **1** with the cross-section varying in the longitudinal direction without impairing the aesthetic external appearance at an advantageous manufacturing cost.

Embodiment 2

The second embodiment of a molding and a method of producing molding according to the present invention will be explained with reference to FIGS. **13** to **26**. The molding of this embodiment is applied to an outer door molding, as shown in FIG. **30**.

The molding **3** of this second embodiment is composed of a support strip **31** and a protector **321** provided in the longitudinal direction of the support strip **11**, as shown in FIG. **13**. The support strip **31** is composed of a mounting portion **311**, an outer piece **313** and a top portion **312** for connecting the mounting portion **311** and the outer piece **313**. As shown in FIGS. **13** to **16**, the height of the outer piece **313** varies along the length of the support strip **31**. The protector **321** is produced by bending a protector piece **320** which is integrally extrusion molded on the inner wall surface of the outer piece **313** of the support strip **31** so as to be engaged with the lower portion of the outer piece **313**.

The support strip **31** is made of a stainless steel sheet. The support strip **31** has the top portion having a constant width and the outer piece **313** having a varying height, and the cross-section of the support strip **31** varies in the longitudinal direction.

The outer piece **313** has a height of H1, as shown in FIGS. **13** and **14**, a height of H2, as shown in FIGS. **13** and **16**, and a height varying in the range of H1 to H2 over the length of L, as shown in FIGS. **13** and **15**.

The lower portion of the outer piece **313** is bent inwardly so as to form an engaging bent portion **314**.

The protector piece **320** is provided at a resin portion **32** along the length of the support strip **31**. That is, the molding **3** is composed of the support strip **31** and the resin portions **32** which are integrally extrusion molded with the surfaces of the mounting portion **311** and the outer piece **313** of the support strip **31** through an adhesive **317**.

A plurality of lips **323** are provided on the resin portion **32** formed on the mounting portion **311** in such a manner as to project outward from the support strip **31**. The lip **323** is provided so as to seal the gap between the molding **3** and a door glass **96**.

The protector piece **320** is provided, in such a manner as to project inwardly, on the resin portion **32** provided on the inner wall surface of the outer piece **313**. The protector piece **320** is engaged with the engaging bent portion **314** at the lower portion of the outer piece **313**, thereby forming the protector **321**. The protector **321** has a function of sealing the gap between the molding **3** and the door **95** and preventing the direct contact between the support strip **31** and the door **95**. The protector piece **320** has an engaging groove portion **3201** which engages the engaging bent portion **314**, and a protector portion **3202**, as shown in FIGS. **14** and **25**.

An extrusion die **4** used for the extrusion molding of the resin portions **32** is shown in FIG. **26**. The extrusion die **4** has a main die **41** and a sub die **42** for molding a protector piece. The main die **41** and the sub die **42** have extrusion orifices **410**, **420**, respectively. The sub die **42** is movable along one side of the extrusion orifice **410** which corresponds to the inner wall surface of the outer piece **313**.

The inner surface of the extrusion orifice **410** has the same shape as that of the inside of the mounting portion **311**, the top portion **312** and the outer piece **313** of the support strip **31** and the protector piece **320**, etc. of the resin portion **32**, and the outer surface of the extrusion orifice **410** has the same shape as that of the lip **323**, etc. of the resin portion **32**.

The main die **41** has on the inside thereof a recessed portion **411** which communicates with one side of the extrusion orifice **410**. The recessed portion **411** is longer than the sub die **42** by the length which is equivalent to the amount of movement of the sub die **42**. The amount H3 of movement of the sub die **42** is determined by the variation of change in the height of the outer piece **313**, namely, (H2-H1).

The sub die **42** is inserted into the recessed portion **411** so as to be movable. A die guide **43** is provided between the main die **41** and the sub die **42** in the direction of the movement of the sub die **42**. A feeding rod **421** is extended from the base portion of the sub die **42** in parallel to the direction of the movement of the sub die **42**, and the feeding rod **421** is connected to a converter **44**. The shaft **451** of a driving motor **45** is connected to the converter **44**, and the converter **44** converts the rotation of the shaft **451** into the linear movement of the feeding rod **421**. The converting mechanism may use a ball screw, for example, instead.

A method of producing the molding **3** will now be explained with reference to FIGS. **17** to **26**.

The surface of a metal sheet **310** having a constant width is first partially coated with a protective film **316** as shown in FIG. **17**. The protective film **316** protects the surface of the metal sheet **310** during continuous forming and extrusion molding.

An adhesive sheet **317** is pasted in advance to the surface of the metal sheet **310** at the portion of the support strip **31** on which the resin portion **32** is extrusion molded, as shown in FIG. **18**.

The metal sheet **310** is then formed into the support strip **31** composed of the mounting portion **311**, the top portion **312** and the outer piece **313**, as shown in FIG. **19**, by roll forming (not shown). At this time the support strip **31** has a constant cross-section.

Thereafter, the resin portions **32** are integrally extrusion molded on the support strip **31**, as shown in FIGS. **20** and **21**, by using the extrusion die **4** shown in FIG. **26**.

At the time of extrusion molding, the support strip **31** is inserted into the main die **41** shown in FIG. **26**. The support strip **31** inserted into the main die **41** is extruded from the extrusion orifices **410**, **420** with the resin portions **32** integrally extrusion molded on the surfaces of the mounting portion **311** and the outer piece **313** by the fusion boding by means of the adhesive sheet **317**. In this way, the lip **323** are formed at the resin portion **32** on the mounting portion **311** of the support strip **31**, as shown in FIGS. **20** and **21**. On the inner wall surface of the outer piece **313** of the support strip **31**, the protector piece **320** is formed at the resin portion **32**.

When the driving motor **45** is driven at the time of extrusion molding, the rotational movement of the shaft **451** is transmitted to the converter **44**. The converter **44** converts the rotational movement of the shaft **451** into the linear movement of the feeding rod **421**. With the linear movement of the feeding rod **221**, the sub die **42** moves along the die guide **43**. The extrusion orifice **420** of the sub die **42** for molding the protector piece thereby moves along one side of the extrusion orifice **410** of the main die **41**.

In this way, it is possible to vary the molding position for the protector piece **320** in the longitudinal direction of the support strip **31** with respect to the outer piece **313** of the support strip **31**.

The thus-extrusion molded protector piece **320** assumes the state of extending obliquely downwardly from the inner wall surface of the outer piece **313**, as shown in FIGS. **20** and **21**. The protector piece **320** is provided with the engaging groove portion **3201** and the protector portion **3202**.

The thus-extrusion molded molding member **30** is then cut to a predetermined length by using a cutting device (not shown).

The lower portion **3130** of the outer piece **313** of the support strip **31** is cut off from the molding member **30** along the protector piece **320**, as shown in FIGS. **22** and **23**. At this time, the cutting position for the lower portion **3130** of the outer piece **313** is varied by the height equivalent to the amount H3 (=H2-H1) of movement of the sub die **42** over the length L. An engaging portion **3140** having a predetermined dimension is left below the resin portion **32** on which the protector piece **320** is formed. The engaging portion **3140** is bent inwardly so as to form the engaging bent portion **314** below the outer piece **313**, as shown in FIGS. **24** and **25**.

The protective film **316** is then stripped off. A "shining ornamental surface" is formed on the outer piece **313** at the portion from which the protective film **316** is stripped. The protector piece **320** is bent in such a manner as to be engaged with the engaging bent portion **314**, thereby forming the protector **321**.

At this time as shown in FIG. **14**, the end portion of the engaging bent portion **314** engages with the engaging groove portion **3201** of the protector piece **320** so as to regulate the vertical movement of the protector piece **320**. The bent angle portion of the engaging bent portion **314** engages with the protector portion **3202** of the protector piece **320** so as to regulate the horizontal movement of the protector piece **320**. The protector portion **3202** constitutes the protector **321** after the protector piece **320** has engaged the engaging bent portion **314**.

In this way, the molding **3** is obtained which has the top portion **312** with a fixed width, the outer piece **313** having a varying height and the resin portions **32** such as the protector, and the cross-section of which varies in the longitudinal direction of the support strip **31**, as shown in FIGS. **13** to **16**.

The molding **3** obtained in this manner is mounted on a vehicle along the border between the door **95** and the door glass **92**, as shown in the prior art in FIG. **30**. The lip **323** of the molding **3** comes into elastic contact with the door glass **92** and exhibits a sealing function. The protector **321** comes into elastic contact with the door glass **95** and exhibits a sealing function. The protector **321** also prevents the direct contact between the support strip **31** and the door **95**.

Since the protector **321** and the like are integrally provided with the molding **3** by extrusion molding, as described above, no burr is produced unlike in the prior art. In the molding **3**, a "shining ornamental surface" is formed on the surface of the support strip **31**, particularly, the outer piece **313**. The molding **3** of this embodiment has therefore an excellent external appearance. The resin portions **32** such as the protector **321** are firmly bonded to the support strip **31** by integral extrusion molding.

In addition, since it is easy to form the protector **321** in the longitudinal direction of the support strip **31**, great reduction in manufacturing cost is possible in comparison with a conventional method.

As described above, according to this embodiment, it is possible to produce the molding **3** with the cross-section varying in the longitudinal direction without impairing the aesthetic external appearance at an advantageous manufacturing cost.

Embodiment 3

The third embodiment of a molding and a method of producing the molding according to the present invention will be explained with reference to FIGS. **27** to **29**. The molding of this embodiment is applied to an window molding, as shown in FIG. **30**.

The molding **5** of this third embodiment is composed of a support strip **51** and resin portions **52**, and a protector **521** is provided on the resin portion **52** in the longitudinal direction of the support strip **51**, as shown in FIG. **27**. The support strip **51** is composed of a mounting portion **511**, an outer piece **513** and a top portion **512** for connecting the mounting portion **511** and the outer piece **513**. As shown in FIGS. **27** to **28**, the height of the outer piece **513** varies along the length of the support strip **51**. The protector **521** is produced by bending a protector piece **520** which is integrally extrusion molded on the inner wall surface of the outer piece **513** of the support strip **51** so as to engage the lower portion of the outer piece **513**.

In this way, the molding **5** has the same structure as the molding **3** of the second embodiment and the manufacturing method and the advantages which the molding **5** brings about are also the same.

The molding **5** of this embodiment is the most different from the molding **3** in that a water guide **522** is provided at

the upper portion of the outer piece **513**. The water guide **522** is provided on the resin portion **52**. Since the resin portion **52** is made of an ionomer resin, the adhesive sheet **317** in the second embodiment is dispensed with.

The molding **5** is mounted on a vehicle along the border between the pillar **93** and the window glass **94**, as shown in the prior art in FIG. **30**. The water guide **522** smoothly sheds off rainwater toward the roof during the travel of the vehicle.

The protector piece **520** has a resin plate **5203** which is integrally molded with the protector **521**, as shown in FIGS. **28** and **29**. The protector piece **520** also has the function of a contacting member. Therefore, the protector piece **520** enhances sealing property for the gap between the molding **5** and the window glass **94** and prevents the window glass **94** from being damaged.

Other advantages are the same as in the second embodiment.

In FIGS. **27** to **29**, the reference numeral **523** denotes a lip, **5201** an engaging groove portion, **5202** a protector portion, **514** an engaging bent portion and **516** a protective film for protecting a "shining ornamental surface". These elements are the same as those in the second embodiment.

Embodiment 4

The fourth embodiment of a molding and a method of producing the molding according to the present invention will be explained with reference to FIGS. **30** to **36**. The molding of this embodiment is applied to a window molding, as shown in FIG. **30**.

The molding **100** at this fourth embodiment is composed of a support strip **11**, a protector **121** and a water guide **122** provided in the longitudinal direction of the support strip **11**. The support strip **11** is composed of a mounting portion **111**, an outer piece **113**, and a top port ion **112** for connecting the mounting portion **111** and the outer piece **113**.

As shown in FIGS. **30** to **36**, the outer piece **113** has the same height along the length of the molding. The protector **121** is so integrally provided with the outer wall of the outer piece **113** that the height between the protector **121** and the upper end of the outer piece **113** is gradually decreased. In other words, as shown in FIG. **32**, the height H**5** between the lower end **1145** and the upper end of the outer piece **113** is the same at any portion of the nolding. While the height H2 at the front side of the molding between the protector **121** and the upper end of the outer piece **113** is gradually decreased to the height H1 at the back side of the molding as shown in FIGS. **30** and **31**. It follows as a consequence that the height between the lower end **1145** of the outer piece **113** and the protector **121** is gradually increased from the front to the back sides of the molding over its length, as shown in FIGS. **30** to **32**. Other constructions are the same as those described in Embodiment 1.

The molding **100** of this embodiment is obtained from the process for cutting the molding that has been extrusion molded to a predetermined length, requiring no further process for cutting the lower portion of the outer piece **113**, as shown in FIG. **11**, of the producing method described in Embodiment 1. The molding obtained from the method according to this embodiment is substantially the same as that obtained from Embodiment 1 as shown in FIG. **10**.

This fourth embodiment, thus, provides the same effects as those of Embodiment 1.

Embodiment 5

The fifth embodiment of a molding and a method of producing the molding according to the present invention will be explained with reference to FIGS. **37** to **43**. The molding of this embodiment is applied to a window molding, as shown in FIG. **37**.

The molding **101** at this fifth embodiment is composed of a support strip **11**, a protector **121** and a water guide **122** provided in the longitudinal direction of the support strip **11** as shown in FIGS. **37** and **38**. The support strip **11** is formed to have a substantially Z-shaped cross-section, and is composed of a top portion **112**, an outer piece **113**, and a mounting portion **119**. A resin portion **12** is integrally extrusion molded with the surface of the support strip **11**.

As shown in FIGS. **37** to **43**, the outer piece **113** has the same height along the length of the molding. The protector **121** is so integrally provided with the outer wall of the outer piece **113** that the height between the protector **121** and the upper end of the outer piece **13** is gradually decreased.

As shown in FIG. **39**, the height H**6** between the lower end **1146** and the upper end of the outer piece **113** is the same at any portion of the molding. While the height between the protector **121** and the upper end of the outer piece **113** is gradually decreased from the height H**2** at the front side to H**1** at the back side of the molding as shown in FIGS. **37** and **38**. It follows that, as shown in FIGS. **37** to **39**, the height between the lower end surface **1146** of the outer piece **113** and the protector **121** is gradually increased from the front to the back sides of the molding along its length.

The mounting portion **119** is fixed to a pillar **93** with, for example, a screw and the like (not shown). Since the height between lower end surface **1146** of the mounting portion **119** and the protector **121** varies along the length of the molding as aforementioned, the height of the pillar **93** is gradually decreased from H**22** at the front to H**11** at the back sides of the molding as shown in FIGS. **37** and **38**. Other constructions are the same as those described in Embodiment 1.

The molding **101** of this embodiment is obtained from extrusion molding, using the same method of Embodiment 1.

Like Embodiment 4, the method for producing the molding in this embodiment requires no process for cutting the lower portion of the outer piece **113**.

The molding **101**, thus, is obtained from forming the protector **121**, the water guide **122** and the resin portion **12** by integrally extrusion molding to the surface of the support strip **11**.

While there has been described what are at present considered to be preferred embodiments of the invention, it will be understood that various modifications may be made thereto, and it is intended that the appended claims cover all such modifications as fall within the true spirit and scope of the invention.

What is claimed is:

1. A molding for an automobile which is mounted between a pillar of the automobile body and a window glass of the automobile, said molding comprising:

a protector in contact with a surface of the window glass;

a water guide spaced from said protector such that an open channel is defined between said water guide and said protector, and wherein said channel is open toward a center of said window glass; and

wherein a gap between said protector and said water guide gradually decreases in size toward an upper portion of said window, and wherein said protector and said water guide are monolithically molded by extrusion molding.

2. A molding as recited in claim **1**, wherein said protector includes a first portion extending toward the center of said

window glass and a second portion extending toward a side edge of said window glass.

3. A molding as recited in claim **2**, further including a support strip, and wherein said second portion of said protector is disposed between said support strip and said window glass.

4. A molding as recited in claim **3**, wherein said support strip includes an outer piece which extends along a length of said channel, said support strip further including a mounting portion and a top portion, said top portion extending between said outer piece and said mounting portion.

5. A molding as recited in claim **4**, further including a lip connected to said mounting portion of said support strip, said lip projecting from the support strip to seal a gap between said support strip and the pillar of the automobile body.

6. A molding as recited in claim **1**, wherein said protector includes a first portion extending toward the center of the window glass and wherein said molding further includes a second portion extending from said first portion and over a side edge of the window glass, and further wherein said first portion and said second portion are monolithically molded by extrusion molding.

7. A molding as recited in claim **1**, further including a support strip connected to said protector and said water guide, said support strip including a mounting portion connected to the pillar of the automobile.

8. A molding as recited in claim **1**, further including a support strip connected to said protector and said water guide, said support strip including an outer piece disposed such that said channel extends along a length portion of said outer piece, and wherein said support strip further includes a mounting portion and a top portion, said outer piece extending between said top portion and said mounting portion.

9. A molding as recited in claim **8**, wherein a height of said outer piece extends between said mounting portion and said top portion, and said protector is disposed at a varying height location with respect to said outer piece along said length portion of said outer piece.

10. A molding as recited in claim **9**, wherein said height of said outer piece is constant along said length portion of said outer piece.

11. A molding as recited in claim **1**, wherein a base portion of said molding extends between said protector and said water guide, and wherein said protector, said base portion and said water guide delimit said open channel.

12. A molding for an automobile which is to be mounted between the automobile body and a window glass of the automobile comprising:

a protector which contacts a surface of the window glass;

a water guide spaced from said protector;

a base portion extending between said protector and said water guide, said base portion having a width which varies along a longitudinal direction of the molding;

wherein said protector and said water guide each include portions extending from said base portion toward a center of the window glass, and further wherein said base portion, said protector and said water guide delimit an open channel which opens toward a center of said window glass.

13. A molding for an automobile as recited in claim **12**, wherein said width of said base portion is in a direction extending between said protector and said water guide, and wherein said width decreases in size along the longitudinal direction of said molding to thereby provide a decreasing spacing between said protector and said water guide.

14. A molding for an automobile as recited in claim **12**, wherein said protector includes a first portion extending in a first direction and a second portion extending in a second direction substantially opposite to said first direction, wherein said base portion of said molding extends from a location substantially between said first and second portions of said protector, and wherein said base portion extends in a direction transverse to said first and second directions, and further wherein said first direction extends toward a center of the window glass and said second direction extends toward a side edge of the window glass.

15. A molding for a window as recited in claim **12**, further including a support strip, said support strip including an outer piece, a mounting portion and a top portion, said top portion extending between said outer piece and said mounting portion, and wherein said outer piece of said support strip extends along said base portion.

16. A molding as recited in claim **15**, further including a lip member connected to said mounting portion of said support strip.

17. A molding as recited in claim **16**, wherein said protector, said base portion, and said water guide are monolithically molded by extrusion molding.

18. A molding as recited in claim **17**, wherein said outer piece of said support strip includes a first bent portion which is bent in a first direction, said first bent portion disposed adjacent to said protector, said outer piece further including a second bent portion bent in a direction opposite to said first direction, and wherein said second bent portion is disposed adjacent to said water guide.

19. A molding as recited in claim **15**, wherein said protector, said water guide, and said base portion are monolithically molded by extrusion molding, and wherein said support strip is formed of a different material than that of said protector, said water guide, and said base portion.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 5,804,118
DATED : September 8, 1998
INVENTOR(S) : Yukihiko Yada, et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

The title page, showing the illustrative figure, should be deleted and substitute therefor the attached title page.

The drawing sheet, consisting of Fig. 1, should be deleted to be replaced with the drawing sheet, consisting of Fig. 1, as shown on the attached page.

Signed and Sealed this

Twenty-first Day of November, 2000

Attest:

Q. TODD DICKINSON

Attesting Officer

Director of Patents and Trademarks

United States Patent [19]

Yada et al.

[11] **Patent Number: 5,804,118**

[45] **Date of Patent: Sep. 8, 1998**

[54] **MOLDING AND METHOD OF PRODUCING THE SAME**

[75] Inventors: **Yukihiko Yada**; **Kazuyoshi Higuchi**, both of Oobu, Japan

[73] Assignee: **Tokai Kogyo Kabushiki Kaisha**, Oobu, Japan

[21] Appl. No.: **637,172**

[22] Filed: **Apr. 24, 1996**

Related U.S. Application Data

[62] Division of Ser. No. 130,392, Oct. 1, 1993, Pat. No. 5,534,316, which is a division of Ser. No. 781,374, Oct. 23, 1991, Pat. No. 5,281,291.

[30] **Foreign Application Priority Data**

Oct. 24, 1990 [JP] Japan 2-286708
Nov. 8, 1990 [JP] Japan 2-304884

[51] **Int. Cl.**[6] **D01D 5/20**

[52] **U.S. Cl.** **264/167**; 264/177.1; 264/177.2; 52/708; 52/400; 52/716.5

[58] **Field of Search** 49/479, 373, 374, 49/488, 490; 296/93, 201, 208; 52/208, 400, 716, 397, 402, 403, 718.1, 716.2, 716.4, 716.5; 264/177.1, 177.2, 167, 40.7, 177.17, 117.1

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Primary Examiner—Merrick Dixon

Attorney, Agent, or Firm—Oblon, Spivak, McClelland, Maier & Neustadt, P.C.

[57] **ABSTRACT**

A molding with the cross-section thereof varying in the longitudinal direction. The molding includes: a support strip; and a protector provided along the length of the support strip so as to bring the molding into contact with a window glass; the support strip including a mounting portion, an outer piece with the height thereof varying along the length of the support strip and a top portion for connecting the mounting portion and the outer piece; and the protector being integrally provided with the outer piece of the support strip at the lower portion thereof by extrusion molding.

19 Claims, 25 Drawing Sheets

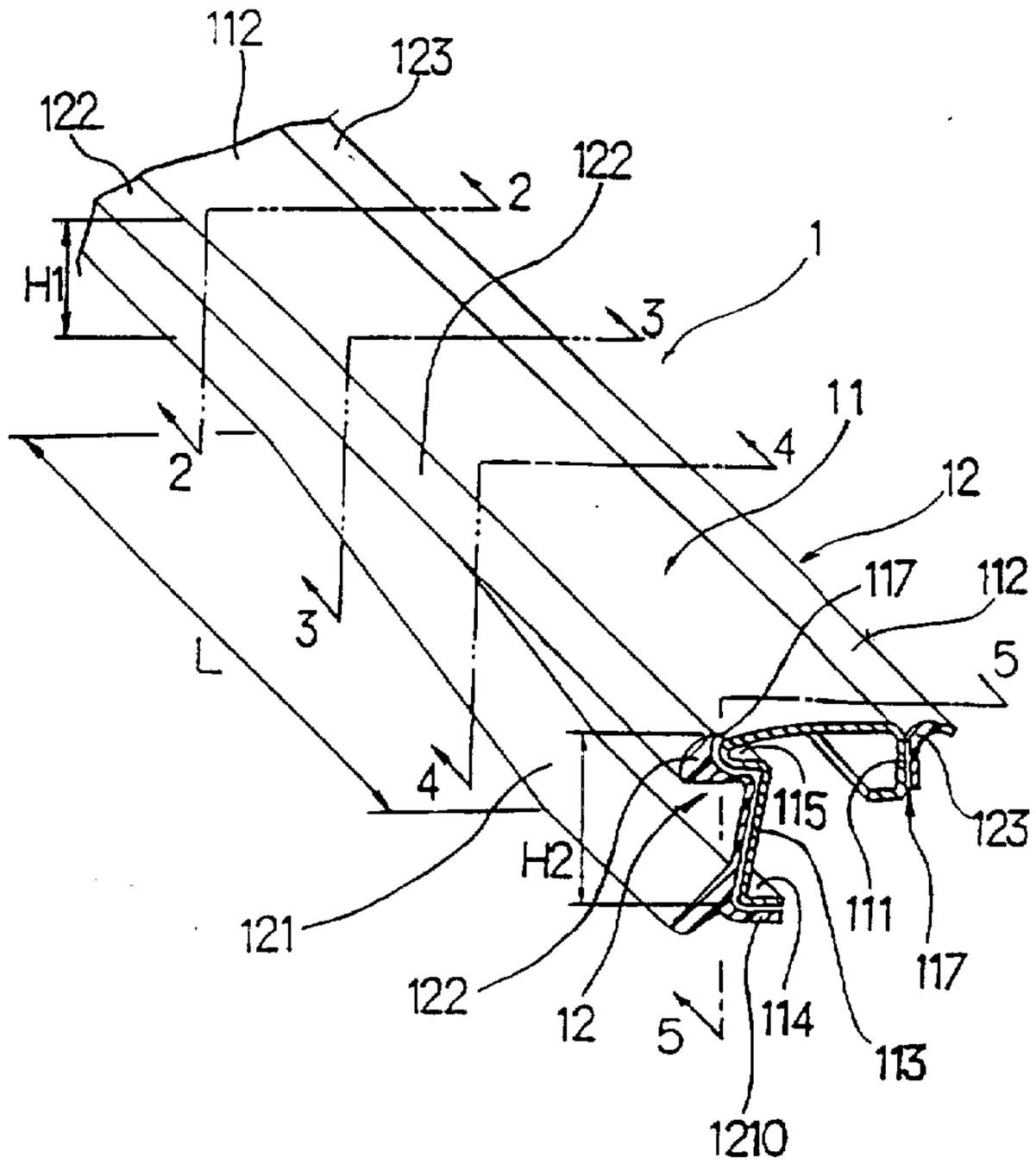
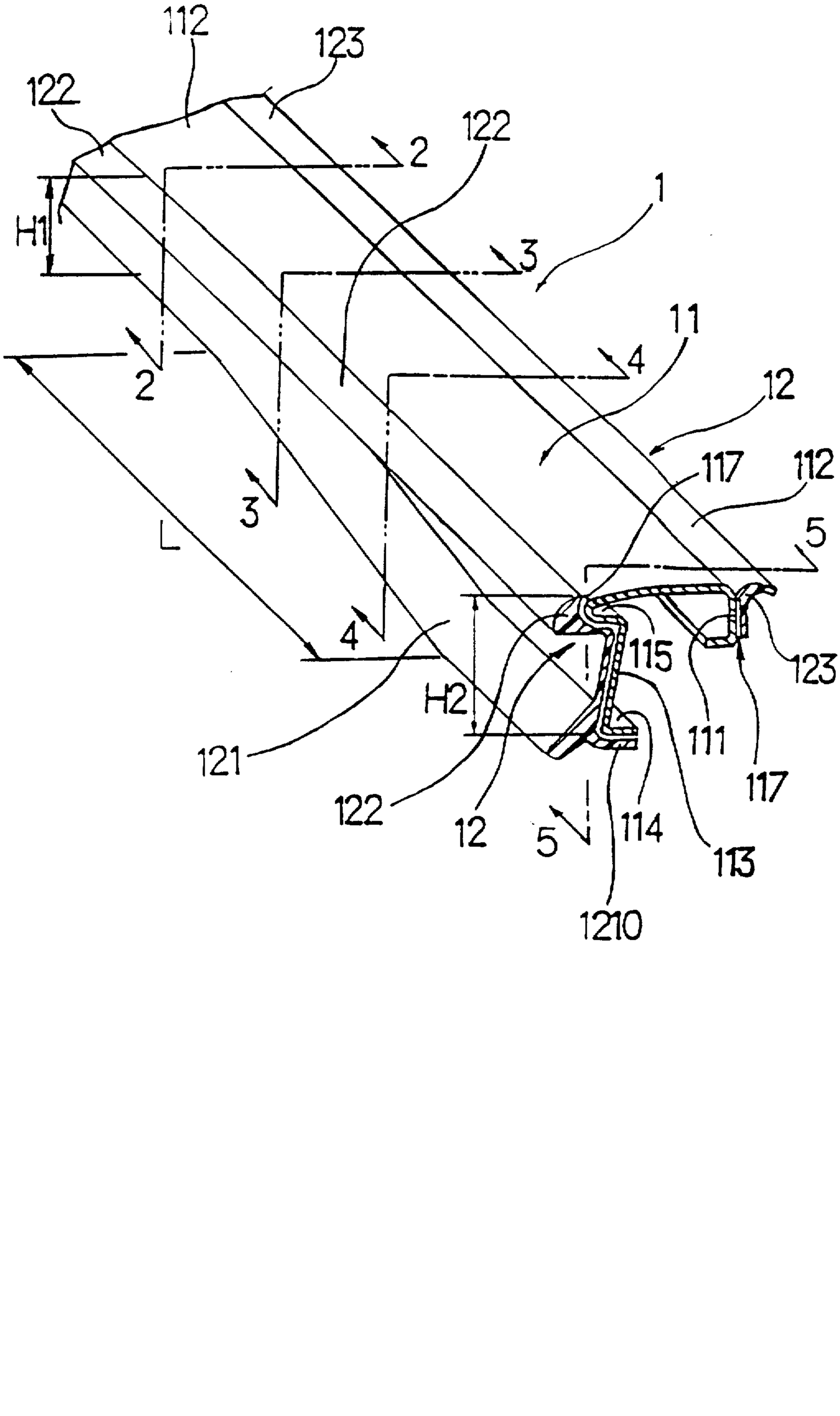


FIG.1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